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CAUTERIZATION OF THE FOUR SUSCEPTIBLE AREAS OF THE NASAL MUCOSA.*

BY PROFESSOR GUSTAV KILLIAN, FREIBURG-IN-BR.

Recent endeavors to reconstruct the methods of treatment of hay-fever along thoroughly scientific principles have been more successful in theory than in practice. I did not concern myself much with the Dunbar theory, but was especially interested in developing my own clinical data gathered for many years, and thereby happened upon a therapy which produces temporary relief, and for which patients are grateful. This therapy is not only of service in hay-fever, but also in the various forms of reflex neurosis, known to us collectively as a vasomotor rhinitis, a class to which bronchial asthma may also be added.

My basis for procedure is as follows: The mucous membrane of the nose, like all other mucous membranes, may become hyperaesthetic. Such hyperaesthesia may exist without definite manifestation of inflammation. This may easily be detected with the probe, a very convincing yet somewhat crude method of examination; for the hyperaesthesia manifests itself sufficiently in cases where even a much milder irritant, such as dust, causes tickling and a tendency to sneeze. The presence of a hyper-sensitive mucosa may be definitely determined by delicate probing, and by similar probing of the normal mucosa valuable comparative data can easily be gathered.

The hyper-sensitiveness of the nasal mucosa is produced in vasomotor rhinitis by prolonged irritation, sometimes of the mildest form, brought about by changing conditions in the seasons of the

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year, habits and occupation. In most of these cases, the irritation is a mechanical one, due to fine dust particles, or to various pollen which have an additional chemical reaction. A patient may be exposed constantly, or daily at definite periods, to the harmful effect of dust, or, not until he is exposed to the dust upon the street. This irritation produces a varying degree of discomfort in different patients. There are predisposing general and local conditions, where a narrowed lumen of the nares with impaired nasal respiration, and catarrhal conditions, or greater sensitiveness of the mucosa and more pronounced irritability of the nervous system exist, where acquired or hereditary causes must be considered.

It is evident that dust particles which act purely mechanically provoke only slight irritation. Repeated irritations of this character must eventually produce a hyper-sensitiveness. This condition will develop more rapidly when toxins are liberated by the dissolving of these particles, to which the mucosa is especially sensitive. It may happen, however, that such irritating substances are present in gaseous form in the air taken during respiration, so that it is not a mechanical but a distinctly chemical irritation with which we have to deal. It is remarkable that some gaseous substances, as the perfumes of flowers, for example, are irritating to some and not to others. My only explanation for this is that a hyperaesthesia of the nasal mucosa, especially of the olfactory region, has been previously developed. In my further investigation I shall eliminate such cases in which gaseous substances are etiological factors. They belong to a special class because in these the irritation extends over the entire nasal mucosa and even to the mucous membrane of deeper areas of the respiratory tract. It cannot be denied that those areas on which the impurities of the air are first impinged are most infected, even though the influence of pollen is locally and specially active in the olfactory region.

Let us consider only the harmful effects of dust particles. If this effect takes place at all, it must act most violently at the first point of contact and where it is deposited in largest quantities, and distinctly located in the anterior cavities of the nose. Where opportunity affords an examination of a patient who has just worked in dust or soot, we find large deposits anteriorly on the septum, and on the anterior ends of the inferior and middle turbinates. This has been definitely verified experimentally.

The air taken during respiration does not pass directly backwards through the nose in a straight horizontal line, but follows a curve up-

wards, as the current of air passes over the curved floor of the nose in an upward direction. The air is cleansed of its dust particles mainly in the anterior nares. The ciliary activity and increased mucous secretion cannot remove these dust particles with sufficient rapidity to overcome this intense irritation. In this way inflammation may be produced and the tendency to hyperaesthesia increased, especially when these particles act not only mechanically, but also chemically.

The irritation of the deeper nasal mucosa can scarcely be compared with that to which the anterior area of the nose is subjected. To the more intense effect of dust must be added the direct sensation of an irritation in the anterior nares. This is experienced most acutely by patients in whom a hyper-sensitiveness already exists, and in which the effect locally is emphasized. The patient feels distinctly the above mentioned points—that is, the anterior portion of the septum and the anterior end of the lower turbinate; but I am not able to speak with certainty of the middle turbinate. The feeling of discomfort after an intense irritation may increase to a strong tickling sensation, and this is not diffuse, but distinctly localized in two spots, one being lateral, the other medial.

The lateral lies slightly above the region of the anterior end of the middle turbinate; the medial is felt on the upper part of the septum about the tubercle. By probing one can easily prove that just these two spots exhibit the greatest sensitiveness, showing at the same time a most varying degree of sensitiveness and difference in the sensibility of these two localized spots. Sometimes the two points on the one side are more sensitive than on the other; again the medial is more sensitive than the lateral, or vice versa. My experience has been acquired through numerous observations of these conditions.

Patients designate these spots with the greatest precision and call the physician's attention to them; but I am able to speak from personal experience because I have often suffered from vasomotor rhinitis and mild hay-fever. At such times, it was only necessary to pull apart a fragment of cotton. The fine particles of dust caused thereby immediately brought on an attack, which proved how small a mechanical irritation need be to affect a sensitive mucous membrane.

I cannot forego the remark that these sensitive spots are located in the region of the ethmoidal nerve, which supplies the anterior nasal cavities with a medial and lateral branch. This form of hyper-

aesthesia, therefore, is dependent exclusively on an irritation of this branch of the trigeminal nerve.

Hyperaesthesia of the nerve ends of the mucous membrane results in an accentuation of the normal reflexes, tickling and tendency to sneeze and increased secretion, because of the extension of the irritation. The reflex action upon the secretions need not be localized. A slight irritation with the probe in the anterior nares will often produce a localized hyper-secretion, at many points on the mucosa mucous globules appear. Most often, however, this hyper-secretion is diffused along the entire mucosa. This symptom-complex does not depend upon the amount of irritation, but rather on the degree of hyperaesthesia. The slightest irritation can sometimes produce in a highly sensitive mucosa an enormous hyper-secretion, so that the secretion flows copiously from the nose. We deal in this case with a reflex condition of local origin. In cause and effect it is limited to the region of the nose. As it is the ethmoidal nerve which is affected, the reflex curve is in the direction of the first branch of the trigeminus and extends through the medulla oblongata.

The characteristic condition resulting from the oft repeated process of such reflex action we call reflex neurosis. In all so-called cases of vasomotor rhinitis and hay-fever we deal with a local reflex action which occurs most frequently when there is much dust, and which is sometimes prolonged into the colder seasons, where special conditions must be considered.

The irritation originating in the ethmoidal nerve can extend to other nerve areas. Sneezing is an example of this. Here the entire breathing mechanism and above all the vagus nerve is brought into play. In case of vasomotor rhinitis, too, and especially in the milder forms of hay-fever, all possible modifications must be considered. The irritation extends to other branches of the trigeminus, chiefly to those of the eyes, and to the vagus. The question then resolves itself into one of reflex neurosis of nasal origin, and of reflexes widely disseminated from this area.

It seems remarkable that the irritation extending to the vagus should result in a typical manifestation familiar to us as asthma. The relation of bronchial asthma to the nasal cavities, especially in the vasomotor forms of rhinitis, are established beyond doubt by numerous observations. The most convincing proofs are to be found in hay-fever patients suffering from asthma where the attacks vary from the lightest to the severest form.

In other cases of asthma, the local nasal conditions diminish until they are scarcely noticed by the patient. The hyperaesthesia of the nasal mucous membrane and especially of sensitive spots brings us to a proper understanding of the subject. I have observed that in tickling these spots with a probe an attack of asthma or asthmatic symptoms could be produced. I must avoid becoming interested in the confused theme of bronchial asthma, and would emphasize—only to avoid misunderstandings—that asthma and asthmatic conditions may be induced from reflexes other than those of the nose. I wish to consider here only asthma of nasal origin that I, generally speaking, class as a quintus vagus neurosis. Here also the reflex arch may be continued through the medulla oblongata, and it should be emphasized that in these cases a psychic influence is more frequently possible than in localized nasal reflex neurosis.

And now to the treatment of these conditions, which must be a twofold one.

(1) Local treatment: Removal of causes which excite hyperaesthesia of the mucous membrane and elimination of reflexes as well as of predisposing causes within the nose.

(2) General treatment: When the nervous system is to be considered. This we can sometimes accomplish, but incompletely. Dust and similar substances can be avoided to a certain extent, but we can bring about best results through mechanical interference in the internal nose, in conditions of deflected and thickened septum, chronic rhinitis with swelling and hypertrophy of the turbinates, nasal polypi, and accessory sinus affections.

Aside from all this, we must employ a rational therapy to allay a hyperaesthesia of the nasal mucous membrane. Above all else, it is imperative that the above mentioned reflex curve be attacked at an easily accessible point. This is most easily accomplished at the very beginning—that is, on the surface of the hyper-sensitive mucosa, and will be most effective if we accurately reach the above-mentioned irritable points.

This method has been employed before, but was imperfect because the process was only a partial one, and areas were included where no therapy was needed. Thus for a long time the inferior turbinate was cauterized along its entire surface. Spiess called attention to the tubercle of the septum and cauterized it. I was soon convinced that it was necessary to cauterize all points of irritation at one sitting. The cauterization must be carried out on both the medial and lateral points, that is, at four points, and it is best done

with trichloroacetic acid, which is applied on these spots after preliminary cocaineization.

As this reagent diffuses itself very rapidly, it should be applied with a small cotton-tipped applicator, and care used to keep it circumscribed. On each of these four areas a cauterized surface of less than one-half inch diameter suffices.

With such limitation, the results, even when all four points are cauterized at once, are comparatively slight. The patient is directed to remain quiet from one to two days, and in a few days the surfaces are healed.

In the majority of cases results are at once noticeable, while in other cases improvement is delayed until the eschar after cauterization has disappeared.

My experience in a large number of cases has convinced me of the palliative effect in some, and even complete cure in others. The result is seldom permanent, and is only of temporary value, being effective for a period of several weeks. That, however, can extend over an entire hay-fever season. There is no contra-indication to recauterization. By means of this therapy, stubborn cases are often made to yield. This method should not be considered a universal cure, especially not in cases of many years' standing, but it should be given a trial even in such cases.

I feel justified in recommending this technique. In the hands of the skillful and careful rhinologist, this procedure in conjunction with other indicated intranasal medication, will prove of much value to the patient.

39 Friedrichstr.

CHRONIC SUPPURATION OF THE FRONTAL SINUS.

BY H. P. MOSHER, M. D., BOSTON, MASS.

The past two years have added a number of new facts which bear upon chronic suppuration of the frontal sinus and the methods which are employed for its treatment. About certain of these I wish to speak. The use of the X-ray has become a routine procedure for giving the size and the location of the sinus. It is the only means of determining whether the sinus remains in the orbit as an anterior ethmoid cell or whether it has developed normally and risen out of the orbit into the brow. It tells the operator how far above the root of the nasal bone he can safely enter the sinus, and, therefore, how large a bridge of bone he can leave above the inner angle of the orbit. It is essential to know this, because experience has shown that if no bridge is left excessive deformity results. Those operators who prefer to enlarge the duct of the sinus with a burr passed upward through the nose must find the lateral X-ray plate their chief reliance, because in no other way can they determine the extent of the basal relationship between the floor of the sinus and the ethmoid region.

Clinical experience has shown that in the majority of cases where there is pus in the frontal sinus a good X-ray plate will indicate it. For this reason the X-ray has become of great diagnostic value. It should be remembered that in acute inflammation of the sinus the infiltrated mucous membrane will give a shadow on the plate. If one wishes, the progress of the inflammation can be watched by taking successive plates. Without a history which indicates it the presence of a shadow in a suspected sinus does not mean chronic inflammation. Even where chronic inflammation of the sinus does exist, if the pus has been discharged into the nose or into the orbit there may be no shadow on the plate. This explains why in some cases of marked exophthalmos or ethmoid tumor the plate findings are not positive. By not bearing this point in mind, operators have been disappointed with their plates. I found on washing out the antrum and then using suction by means of the vacuum apparatus that the plate taken after this had been done made the diseased antrum look like a normal antrum, even more normal than the undiseased one. The vacuum apparatus might have the same effect upon the mucous membrane of the frontal sinus.

The vacuum apparatus is a valuable method of bringing pus from the frontal sinus into the nose for diagnostic purposes. At once

one thinks of using it in attacks of acute inflammation in order to open up the duct and drain the sinus. The apparatus which I have used is so powerful I have felt that it might increase the hyperæmia in the sinus and so perhaps add to the severity of the inflammation. Further experiment is needed in order to settle the safety and the efficiency of this method.

The question as to the operation of choice in chronic suppuration of the frontal sinus is still an unsettled one. There are three prominent methods in use. We are gradually coming to conclusions as to their relative efficiency. Where there is a large basal relationship between the floor of the sinus and the ethmoid region of the nose, if the patient is willing to take the large chances of failure, the operator may open the front wall of the sinus far enough above the orbital rim to leave a bridge and then make as large an opening from the sinus into the nose as is anatomically possible. This procedure will occasionally result in a cure. In my experience it has failed so much oftener than it has succeeded that the patient must elect this method; I will not advise it.

The method of obliterating the sinus by granulations is very alluring in theory. One-half of the cases which I have done by this method I have had to do over again. I have not had the good fortune to obliterate the sinus in the short time given by some operators. The method is tedious for both patient and operator. The deformity resulting from it is very marked in a large sinus and considerable in a small one. The injection of paraffin will diminish the deformity or do away with it entirely. Paraffin must not be used until it can be placed in sterile connective tissue. If it reaches any ungranulated pocket or projects into the nasal cavity it will act as a foreign body and slough out. I have proved this to my discomfort by filling two frontal sinuses with paraffin after the cavities of the sinuses had become covered with a good coating of granulations. The skin incision readily closed over the paraffin. In both cases, however, a part of the incision opened again later and paraffin was discharged in small pieces partly through a persistent fistula and partly through the nose.

The great aim of all operators is to cure the suppuration and leave no deformity. My experience with sixteen Killian operations is that this procedure will accomplish these two things better than any other. I am positive as to its great merits in causing little or no deformity. Last June at Toronto, I showed a series of casts illustrating this point. Further observation of these cases and observations on cases operated since have convinced me that a sinus of

moderate size operated by the modified Killian operation will have no deformity and that very large sinuses can be operated by the same method and still there will be no deformity. Of these sixteen cases, one-half are cured of their suppuration, four have had the discharge markedly lessened, and four cases have not. One case has required a second operation. All the cases have been freed from pain.

The technique of the Killian operation. I wish to mention a few points in connection with this. In making the opening through the ascending process of the superior maxilla the Krause burr has given me the greatest satisfaction. By using it there is no danger of splintering the nasal bone. It is often useful to delay making the incision through the mucous membrane of the nose until the internal angular process of the frontal has been sufficiently removed to make a large opening into the frontal sinus from below. There is comparatively little bleeding until the nasal mucous membrane is incised. Killian's method of doing away with the posterior nasal plug by packing the choana by narrow cotton tampons passed through the nose is of very great service. In operating in the recumbent position, if strips of gauze are used instead of the cotton tampons, this method of packing may leak a little, so that I reinforce it by a small nasal plug. The great advantage of packing the nasal cavity up to the middle turbinate, as is done in this method, is that one-half of the nasal cavity is obliterated, so that the pool of blood in which the operator has to work is reduced to one-half its depth. Owing to this it becomes possible for the operator to see his way about in the ethmoid labyrinth. Without this packing there is so much blood that the operator has to work by feeling and his knowledge of distances.

In operating upon the ethmoidal cells by the route through the ascending process of the superior maxilla and the lachrymal bone, the operator is working above and to the outside of the middle turbinate. I have repeatedly been annoyed to find how much of the middle turbinate remained after the Killian operation. Often it is half detached and pushed downward a little but not removed. It is better, therefore, if the patient will allow it, to remove the middle turbinate under cocaine as a preliminary procedure, or to sit the patient up and remove it as the first step in the ether operation. In my last operation, I found Hajek's hook very serviceable in detaching the middle turbinate from the superior turbinate. The use of the hook through the opening in the lachrymal bone is especially satisfactory because you can see the olfactory fissure and can pass the

hook directly back in it to the front wall of the sphenoidal sinus. All the time you are working parallel with the cribriform plate instead of at an angle with it, as you have to do if the hook is used through the nose from below upward. The hook will break up the ethmoid cells nicely so that there is but little left for the curette to do. If the middle turbinate is not thoroughly removed it may turn outward like a flapper and glue itself to the os planum and prevent the frontal sinus from draining. If any of the middle turbinate is left its stump must be attacked immediately after the main operation otherwise the middle meatus will fill with secretions and as a consequence the frontal sinus will do the same. If this happens, the sinus fills with pus and the incision in the brow bursts open. In most cases such a happening ruins the operation. Great vigilance in the after care of the middle meatus is the price which it is necessary to pay for a surgical operation.

The turning of the lachrymal sac from its bed requires care, and should not be hurried. If the sac is so bruised that chronic suppuration is set up within it the operation results in a calamity. I have been in constant fear of infecting the sac. In but one case, however, have I had any trouble, and this was only temporary. After the operation, it is well to pack the sac into place by placing a tent of gauze in the inner angle of the orbit. I make it a routine to wash the eye out daily with warm boracic acid solution. The lids can be kept from gluing together by a mild corrosive ointment. If the sac becomes infected probing should be resorted to with the greatest care, if resorted to at all, because the sac has lost its bony bed so that the probe lacks the firm groove which it usually has to guide it.

It should be possible to open the frontal sinus for exploratory purposes without infecting it. Believing this I explored two sinuses which proved to be normal and promptly infected them. I think the chief reason for this is the following: The skin incision was entirely closed and the sinus filled with blood. This is once coagulated into a jelly like cast of the sinus. The blood, therefore, did not drain into the nose and the clot became infected either from the nose or from the skin incision. In order to avoid this post-operative clot I now fill the sinus with gauze for a day or two, then remove it and tie the provisional sutures left for that purpose. In the Killian operation, it is just as important to prevent this clot as it is when a normal sinus is opened.

The pulley of the superior oblique muscle is the only anatomical obstacle to the removal of the whole floor of the frontal sinus. A

sufficient disturbance of the pulley gives double vision. Probably we have been a little too much afraid of the pulley. A recent operative case bears this out. A woman came to the eye clinic with her right eye pushed downward and outward. There was a history of a discharge of pus and blood from the nose some months previously. At the time that she came to the hospital there was nothing to be seen in the nose. The operation showed that the cavity of the sinus and the upper part of the orbit was filled with a brown jelly like mass. This proved to be sterile and was composed of fibrin and disintegrated blood corpuscles. The whole floor of the sinus had been eaten away and the anterior wall was in process of absorption for the curette perforated it in stripping back the perios-teum. Since the whole floor of the sinus had disappeared the pulley of the superior oblique had lost its bony attachment. I was curious to see if the patient would have double vision after the effects of the operation had worn away. Today, four weeks after the operation, there is a little fullness over the inner canthus because the tissues have nothing to which they can attach themselves, yet there is no double vision and never has been any. Therefore, we can allow ourselves more freedom in working about the pulley of the superior oblique than we have allowed ourselves in the past.

The orbital prolongation of the frontal sinus is a great obstacle to the obliteration of the sinus by granulations. If, however, the operator uses Killian's method a large orbital prolongation is not a hindrance but a help. The larger the orbital prolongation the larger the basal relationship between the floor of the sinus and the ethmoid region. By following the *os planum* upward until it merges with the floor of the orbital prolongation and then working outward over the orbit and backward over the orbit as much as the orbital prolongation will allow, such a large opening can be made into the nose that granulations cannot readily close it.

Knowing that the antrum acts as a reservoir for the frontal sinus in chronic suppuration of the sinus, and relying upon the ability of the mucous membrane of the antrum to recover its normal condition by the radical procedure in a few of my cases. Most of these cases, however, finally had to have the antrum opened. The mucous membrane of the antrum had become so thoroughly infected that it had lost its power of recovery. In the future, I shall treat the antrum radically at the time that I treat the frontal sinus and the ethmoid cells.

I have done three double Killian operations, operating upon both sinuses at the same sitting. There is no more shock than when one

sinus is done. It has always surprised me to see how little shock this operation causes. In one of the double Killian cases there was falling of the bridge of the nose at the point where the patient's spectacles rested. In but one case of my sixteen has there been any pitting of the scar along the side of the nose. I have been much pleased to find how the skin scar on the nose fades out. If there has been first intention, after a year the skin scar is barely noticeable. Most of my patients have been women, and some of them young ones, but they have all been pleased with their scars.

Any packing which is put into the sinus or into the nose should be wrapped with Cargile membrane. When this is done the packing slips out without causing bleeding and with very little pain. I cannot recommend too strongly the use of this membrane as a covering for all packing in the nose which is to come against abraided surfaces.

Last year I made the statement that tuberculosis would be found to play a part in causing chronic suppuration of the frontal sinus. Tuberculosis is primarily a disease of the respiratory tract. The accessory sinuses are parts of the respiratory tract and should share in the most common disease of this tract. From the construction of the sinuses, one would expect in them a low grade tuberculosis rather than the active form found in the soft tissues of the lungs. Recently some experimental and clinical work has been carried out which is of interest in this connection. For a long time, eye specialists have had to deal with a low type of scleritis which has baffled both treatment and all attempts to find its cause. This condition has of late been proved to be a low grade tuberculosis. The diagnosis is made by injecting tuberculin. The idea has been suggested that perhaps some of the sclerosing affections of the ear are due to the same cause. Mucous membranes are not given to sclerotic processes but to degeneration with the formation of pus and polypi. It is a suggestive thought that perhaps a low grade tuberculosis of the accessory sinuses may be responsible for a percentage of the cases of chronic suppuration. On this theory, I have tested two cases of chronic suppuration of the frontal sinus, one with ethmoid tumor and one with exophthalmos, but the tuberculin gave no reaction. One of my colleagues was more fortunate. In his case, a girl of fifteen with a discharging fistula over the inner canthus of the right eye, with pus in the nose, with moderate exophthalmos, that it was to all appearances a typical case of disease of the frontal sinus and the ethmoid labyrinth, the injection of tuberculin gave a positive reaction.

In these newly solved cases of scleritis the injection of tuberculin is used first to make the diagnosis and then to effect a cure. In an ethmoiditis or in chronic suppuration of the frontal sinus due to tuberculosis, operative measures may therefore find a great ally in tuberculin. The serum might in such cases do more than the knife. Another recent development in serum therapeutics makes this idea seem less visionary. It is maintained that the opsonins are to rival surgery in the treatment of chronic suppurations. Remove acute symptoms by providing adequate drainage and the opsonins will do the rest is a proposition which the laboratory men are trying to substantiate. At the present time I have one rebellious operated case of chronic suppuration of the frontal sinus under this form of treatment. It is, however, too soon to report results.

As time goes on I cannot bring myself to a belief in the safety and the efficiency of the various methods of treating chronic suppuration of the frontal sinus through the nose. Tubes can be passed into the sinus from below and retained there. I cannot see, however, why the tube does not act in the frontal sinus the same as it does when placed in the antrum through an opening in the alveolus. It acts as a foreign body in one case; it should do the same in the other. If there is a sufficient basal relationship between the floor of the frontal sinus and the nose, a burr can be pushed up through the duct into the sinus, the burr running on a probe as a pilot. The unguided burr is also used. On the cadaver beautiful specimens can be made in this way. What I am afraid of is that these methods will make cadavers of some of my patients. These methods leave out of account the diseased mucous membrane of the sinus and the pockets made within them by septa. If certain operators have so far found the burr method safe that is to be recorded in favor of the procedure. It surely does not look safe. To my mind it is more surgical to open the sinus and see the problem that you have to deal with. The reason why these methods attract is that they leave no deformity. We know, however, that the modified Killian operation also will leave no deformity, and we know that this operation will cure. Operating in the frontal sinus and in the ethmoid region is blind work even when we attack these regions by the most direct routes and with sufficient openings. By preferring the Killian operation, the operator minimizes as much as possible this working in the dark. When the operator cannot see providence must guide the knife.

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THE RAPID ENTRANCE OF THE MAXILLARY ANTRUM THROUGH THE INFERIOR MEATUS WITHOUT GENERAL ANESTHESIA.*

BY H. HOLBROOK CURTIS, M. D., NEW YORK.

It is my purpose to illustrate a rapid method of opening the maxillary antrum from within the nose, rather than to discuss the subject of antrum empyemas, which prompts me to take part in this symposium.

In frontal sinusitis I have insisted that the practice of treatment from within, by removal of the anterior tip of the middle turbinate, breaking down the ethmoid cells in order to permit the entrance of a frontal sinus catheter to the frontonasal duct and constant douching of the cavity, should in almost every case precede the external operation.†

In antral empyemas, a similar expedient should be attempted before deciding upon a radical canine fossa operation. In acute cases, the cure is generally spontaneous, the purulent discharge ceasing when the cold or grip gets well. If this does not occur, but the empyema remains with pain as a symptom, relief may be expedited by daily washing out the antrum by means of a canula passed through the natural orifice, or, a slight enlargement of the same. In chronic cases, we must remove as much of the inferior turbinate body as will permit the making of a fenestration in the interior wall large enough to enable the operator to curette the antral cavity and pack it with iodoform wool. It is my custom to make the opening of such size as will permit the little finger to enter the antrum and do the exploring and, if necessary, the packing. This procedure, thanks to a small digit, I have found very convenient in cases of profuse hemorrhage. There is no absolute rule to follow regarding the dimensions of the fenestration, as the anatomical peculiarities determine the question. In general terms, the larger the better. I have never regretted a large opening. The great advantage of this method of operating is, that the employment of an anaesthetic is not necessary except in very nervous subjects.

The plan of procedure is as follows:

* Read before the New York Academy of Medicine. Section on Laryngology and Rhinology. March 27, 1907.

† *Ann. of Otol., Rhin. and Lar.*, Dec. 1906.

For fifteen minutes a pledget of cotton saturated with 10% cocaine hydrochlorate solution and an equal part of adrenalin chlorid solution 1-3000., is introduced between the inferior turbinate and the antral wall; a smaller pledget is laid over the antral wall in the middle meatus covering the lower turbinate over its line of insertion.

Next, with the turbinectomy scissors the inferior turbinate is incised for about one inch, as near its insertion as possible, and the piece removed with a coarse snare. There is generally no bleeding to prevent the immediate continuance of the operation. If I have not already done so before the removal of the turbinate, I now inject by means of a canula and syringe, a small amount of adrenalin solution with, say 2% cocaine into the antrum, if possible through the natural orifice, or through a small perforation made by a trephine in the inferior meatus wall.



By the time the field is free from blood and the remaining part of the cut turbinate trimmed smoothly with Gruenwald's forceps, the adrenalin and cocaine have rendered the lining membrane of the antrum non-sensitive and anemic.



The next step is the fenestration, which is done with an electric trephine, Volkman's spoons and forceps, or better with a gouge which I have lately devised and found to be a very efficacious instrument, for frequently we encounter very thick and obstinate walls, to break down which requires quite a little force. The gouge which I exhibit is constructed with such a curve that it naturally adapts itself to the preferable point of entrance, viz., as far anterior as possible, and the edges are so ground on the convexity that after the entrance of the instrument we may cut backwards by holding the shaft steadily as we use the mallet.

This instrument takes a tongue out of the wall a quarter of an inch vertically by whatever depth you desire. This tongue in removal, is pressed into the inferior meatus by the gouge, and is clipped off by appropriate forceps. The fenestration is then made oval in shape by means of the burr drill, cutting spoons or sickle knives, care being taken to make the lower edge as near the level of the antral and nasal cavity as possible. By the use of appropriate stiff curettes bent at various angles, the cavity may be very satisfactorily cleansed of the major pathogenic impedimenta, and we are enabled to ascertain whether the inferior border is free from dental complications. If eroded bony areas are found with penetrating roots, the teeth must be removed, and this alone will in many cases prevent the necessity of a more radical operation. After a rapid curetting of the cavity I pack it with iodoform wool and allow it to remain for three days. The end of the wool should be brought out of the nostril and secured, or else it is apt to get into the pharynx and produce tickling. In this way, I have three times cured cases of antrum trouble which have been previously operated on by the canine fossa route. Unlike the mouth, the nasal cavity after operation does not seem to act as a source of reinfection of the accessory sinuses, any more than the purulent secretions of the nose infect the septal operation and the turbinectomies we are constantly performing. I may safely say that this operation has in my practice replaced the canine fossa operation in nine out of ten cases in which I had previously considered the more radical operation to be necessary. With much larger experience, I see no reason to alter my views expressed in a paper read before the Laryngological, Rhinological and Otological Society in 1903 and published in *THE LARYNGOSCOPE* of October of that year. I exhibit the gouge for making the inferior opening as well as a perforator employed for enlargement of the natural orifice, together with trephines, drills, burrs, spoons, sickle knives, curettes, etc., useful in completing the fenestration. The further steps in the treatment of the cavity are too well known to require explanation.

118 Madison Avenue.

**THE INDICATIONS AND ADVANTAGES OF THE INTRA-NASAL
OVER THE RADICAL OPERATION IN THE TREATMENT
OF CHRONIC EMPYEMA OF THE ANTRUM OF HIGH-
MORE AND THE TECHNIQUE TO BE EMPLOYED*†**

BY J. H. ABRAHAM, M. D., NEW YORK.

The diversity of opinion as to the various operative procedures, the indications and advantages of one method over another in treating chronic empyema of the antrum of Highmore, are the primary reasons why we have been requested to participate in this discussion.

The various arguments and logical deductions presented to you in these papers, demand careful consideration and thought. If the suggestions about to be offered are found deficient, we are willing to abide by your just verdict.

The cardinal rule governing the selection of any operation, provided the results obtained are equal, is pre-eminently conservatism. This, gentlemen, leads me to my first argument, a consideration of the anatomic relationships of the intra-nasal as compared with the canine fossa route and the advantages thereof.

The antrum of Highmore is a large cavity situated in the body of the superior maxillary bone, and is pyramidal in shape. The base is directed towards the nose and is formed by the external wall of the nasal cavity, the floor by the alveolar process. The external wall by the facial surface of the superior maxilla. In approaching this sinus it is absolutely necessary that the surgeon should be familiar with these surfaces.

In order to enter the antrum by the canine fossa route the removal of one or more teeth is often indicated. The incisions through the soft structures and bone cut through several branches, and frequently the trunk of the infra-orbital nerves and arteries. In removing the large plate of bone necessary in this operation, we destroy branches of the posterior, middle, and anterior superior dental nerves. The size of the antrum may be so great that it may be in relation with the fangs of the teeth of the superior maxilla, from

* Read before the New York Academy of Medicine, Section on Laryngology and Rhinology, March 27, 1907.

† For Illustrations of Instruments referred to in this Article see THE LARYNGOSCOPE, March, 1907, page 241.

the last molar to the canine, and, as I have often demonstrated upon the cadaver, the fangs may protrude, 8 mm., into the cavity. The Caldwell-Luc operation is practically the above operation, plus the intranasal operation. Now, compare this operation with the nasal inferior meatus route where the removal of the lower border of the inferior turbinate as practiced by me, is indicated not only to favor the entrance into the antrum and facilitate the after treatment, but on account of the hypertrophy of this body which, pathologically considered, is invariably present. The advantages of the intra-nasal route anatomically considered are obvious to every Laryngologist. In adults, the promiscuous sacrificing of so valuable a structure as one or more molar teeth justifies our profound condemnation. The exposed fangs of the teeth that are in relationship with the antrum, the cut branches of the dental, and infra orbital nerves, the extensive incisions through the soft structures and bone, are in my estimation a decided disadvantage, and they place in disfavor the radical operation.

The second indication which I consider of great importance is a thorough understanding of the pathologic lesions involved in chronic empyema. It is not my intention to burden you with a detailed description of inflammation, but merely to draw your attention to a few facts. The primary function of the mucous membrane of the antrum is the elaboration of mucus. It also acts as a protecting covering. Any diseased condition of this mucosa alters its normal physiologic function. Nearly all pathologic lesions of the antrum are inflammatory in character. Therefore, we are justified, from a clinical standpoint, in classifying them into acute and chronic inflammations. Pathologically, the chronic variety is either a sequel or a result of long continued irritation.

The most common etiologic factor as a causative agent in the production of inflammation is undoubtedly infection. In chronic supuration of the antrum we observe extensive pathologic changes, which vary with the individual case. In degree, the changes are far greater than in the acute stage. In the majority of cases, we find the typical pathogenic membrane while the mucosa is often thickened and presents a granular appearance. In a given number of cases connective tissue replaces a considerable portion of the glandular elements. Usually springing from the thickened mucosa we often observe a villous and fungoid growth, while in some cases polypi are found; in others, extensive granulation, and lastly, the great bug-bear of the general surgeons, caries, is found, but in my ex-

perience in very few cases, and generally those that can be traced to a dental origin. No less an authority than Zuckerkandl in his valuable work on "Normale und Pathologische, Anatomie der Nasenhöhle" says that in all his dissections he has never observed a single case of caries resulting from empyema of the antrum.

In my series of cases, caries was detected in only three and these of dental origin and were operated on through the nose. The teeth were extracted and the carious bone curetted and I obtained a radical cure in all of them.

What are the advantages from a pathologic point of view? My clinical experience fails to demonstrate one single advantage pathologically considered in favor of the radical operation, as I have never detected caries that could not be traced to a dental origin. The remaining lesions can be and are successfully treated according to the modern surgical principles by the intra-nasal route.

The third and last indication in favor of this operation that I will present for your consideration, are the surgical indications. The canine fossa operation produces a far greater amount of shock than the simple intra-nasal operation. The time required for the simple nasal operation after cocaineizing varies from three to ten minutes only. Surgeons fully appreciate the great advantage of proper drainage in all infected wounds; therefore, I wish to emphasize this fact, and claim that the intra-nasal operation furnishes as good drainage as can be obtained by the canine fossa operation unless the surgeon removes all the bone, down to the alveolar process, and exposes the fangs of the teeth. This latter operation often results in a painful odontalgia nervosa. (These statements I am fully prepared to defend by numerous dissections in my possession).

Inspection of the antrum through the canine fossa is a direct and ideal procedure; nevertheless, with the aid of a small mirror a complete inspection can be obtained from the nasal cavity.

Repeated packing with gauze as advocated and practiced by a number of operators in the canine fossa operation is, in my estimation, an unsurgical and unscientific procedure, absolutely contra-indicated according to the modern principles of surgery and by the pathologic lesions that are involved. By this method infection is favored by the surgeon and repeated packings produces an unnecessary element of pain. Oozing of pus or secretions from the antrum and the dropping of the gauze into the buccal cavity are most distressing to the patient and very often cause gastric disturbances.

Edema and cellulitis often follows the canine fossa operation, while it has never occurred in a single case that I have operated on through the nose. The patient is unable to treat his antrum through the canine fossa and obtain a favorable result, while through the nasal cavity it is a very simple procedure and the results obtained are good.

Lastly, by repeated packings of the antrum do you intend to eliminate the cavity through the development of healthy granulations, or by removing the gauze and repeatedly curetting the granulations and mucosa, thereby producing excruciating pain, is it intended that the patient should be cured?

In the year 1895, I performed my first radical operation upon the antrum of Highmore and continued to operate by this method until the year 1897. My results were not entirely satisfactory. The pain and discomfort to the patient and the frequent failure to obtain a radical cure, in conjunction with the time required, were the primary reasons why I adopted the intra-nasal route. My first operation upon the antrum of Highmore through the nose was performed in the year 1896, while attending Prof. Krause's clinic in Berlin. To me, this operation was an ideal and simple one for acute cases of empyema of the antrum, but insufficient for the chronic cases. Therefore, on returning to America in 1897, I outlined a plan of treatment, and invented a series of instruments, both of which have since been modified. Since then I have treated successfully 34 cases. This number may seem small to you, but it is limited to those cases operated on and treated by me until discharged, cured. The number of cases operated on by this method could be increased twofold were I to include the majority of clinical and a few private cases that discontinued their treatment shortly after the operation for reasons that no surgeon can control.

The operation as performed by me is an extremely simple surgical procedure. Therefore it affords me pleasure to present my technic in detail. After thoroughly cleansing the nasal cavity, thin pledgets of cotton are saturated in a 5% cocaine and 1:4000 adrenalin chloride solution. A pledget is placed in the middle meatus in the region of the ostium maxillare and another larger is carried underneath and then external to the inferior turbinate body, and pressed against the entire surface of the naso-antral wall, below the attachment of this body. Lastly, the inferior surface of the lower turbinate and antero-inferior angle of the septum are cocaineized. After removing the pledgets of cotton from the middle meatus, needle No.

1 or No. 2 is directed to the middle meatus just below the inferior ethmoidal turbinate, the point hugging the upper convex surface of the inferior turbinate, about three centimeters from the floor. The point should be directed toward the inner wall of the antrum, then with gentle pressure outward with a distinct downward inclination. The point of the instrument will enter the antrum without the least resistance. Thoroughly syringe or douche the antrum with a warm normal salt solution, by connecting attachment No. 7 or No. 8 in order to remove all purulent secretions, then drain the cavity by directing the patient to bend his head sideways with a slight inclination of his face downward so that the diseased cavity will be uppermost. Reverse this position of the patient's head, and through the needle inject the cocaine adrenaline solution, allowing same to remain in the cavity from two to five minutes, depending on the patient's susceptibility to cocaine anaesthesia. Then allow the patient to sit erect, and bring his head to the normal position. A sterile towel is placed around the head so as to cover all of the hair. Then remove the pledgets of cotton remaining in the nasal cavity, and begin your operation by removing the lower border of the inferior turbinated body with my modified Struyckens forceps or any practical nasal cutting forceps down to the bone, and if necessary remove a small portion of the bone. In a majority of cases it is unnecessary to remove the bone. The next step in the operation is to perforate the bony naso-antral wall with the reamer. This instrument is inserted into the nasal cavity with the point directed downward to the floor of the nose and then carried backward $1\frac{1}{2}$ to 2 centimeters from the nasal vestibule; the point is then rotated outward underneath the inferior turbinate through a little more than one-quarter the circumference of a circle. Grasp the patient's head with your left hand, the handle of the reamer with your right hand then plunge the point of this instrument through the bony wall, rotate the hand upward and downward, exerting your pressure on the point of the instrument, outward and then backward, until you make an opening $\frac{1}{2}$ to 1 centimeter in diameter. Withdraw the reamer, and insert the burr into this opening, hold the instrument and the patient's head in the same position; now remove the posterior portion of bone by exerting your force on the burr from above, backward and downward. To remove the anterior portion of bone, reverse this procedure. The upper and lower portions of bone are removed simply by scraping the bone to and fro. The diseased mucous membrane of the antrum is gently curetted with a Myles mal-

leable curette. Wash the antrum of all debris through the silver canula No. 6 or hard rubber canula No. 5. Pack the cavity direct with a $2\frac{1}{2}$ centimeter gauze.

POST OPERATIVE TREATMENT.

To prevent pain and excessive loss of blood, ice compresses are placed upon the cheek bone; a small dose of morphine is indicated in order to counteract the depressing action of the cocaine. After twenty-four hours, a 5% oil of turpentine dissolved in steril olive oil is dropped upon the gauze every three hours to facilitate the removing of the packing on the third day. After removing the packing, the cavity is syringed with a normal salt solution. On the following day and days thereafter, the antrum is cleansed with a boracic acid solution and then thoroughly dried with pledgets of cotton. The mucous membrane of the nasal cavity is sprayed with a non-irritating oil, preferably albolene, and then a weak solution of nitrate of silver is syringed into the antrum so as to come in contact with the membrane lining the entire cavity. If any solution remains it should be absorbed with cotton.

Day by day the strength of this solution is increased, until the mucosa assumes a normal appearance. A few dry treatments with Pulvis Thymo-Iodol is all that remains to cure your patient and leave him the proud possessor of a practically normal antrum of Highmore.

616 Madison Avenue

SOME POINTS ON THE RESECTION OF THE CARTILAGINOUS SEPTUM.*

BY D. BRADEN KYLE, A. M., M. D., PHILADELPHIA.

It is my purpose in this paper to call attention to a few points in connection with the resection of the triangular deflection of the cartilaginous septum, and it is to this particular form of septal deflection that my remarks apply, and I do not intend this paper to cover any other form of deflection.

The resection of a portion of the triangular cartilage is by no means a new procedure, but recently there has been a tendency to advocate, I think, a too radical method. The saving of the mucous membrane and a portion of the cartilage, also the prevention of scar tissue, is the essential features in this operation. In the triangular deflection much difficulty has been experienced in freeing the mucous membrane at the point of angle and at that point there is great danger of perforation and ulceration. In such cases I have followed with excellent success the following method: By forcing the finger into the occluded nostril the triangular cartilage can be shoved over sufficiently to force it out on the open side. I then make an incision through the mucous membrane, just a little beyond the junction of the skin and mucous membrane, cutting down directly over the anterior edge of the triangular cartilage. By stretching open this incision and making pressure with the finger in the occluded nostril the cartilage can be pushed forward through the incision. It is extremely necessary in order to dissect successfully the mucous membrane from the cartilage that the incision should be carried through the perichondrium to the cartilage; once this is done the mucous membrane can be stripped from the cartilage very easily. Personally, I prefer the dural separator to any of the knives devised for the purpose. My reason for this is, that it is more flexible, blunt pointed and less likely to cause perforation. When the mucous membrane is dissected back on the occluded side to the apex of the triangle, then, instead of trying to dissect around the angle, I force the cartilaginous septum over into the median line by means of the nasal dilator. By doing this two or three times the septum is sufficiently pushed over or rendered sufficiently pliable that it can be held almost in the median line by pressure from the finger. You will notice that the cutting and dissection has all been done through the wide open nostril on the opposite side from the obstruction, there being no incision made on the obstructed side. The mucous membrane, up to this point, is already separated from the cartilage back

* Read before the Section on Otology and Laryngology of the College of Physicians, Philadelphia, April 17, 1907.

to the angular part of the deflection; at this point some difficulty is usually experienced, owing to the fact that the mucous membrane having been subjected to irritation by continued chronic inflammatory changes, is adherent. This tendency to adhesion is more marked usually at the floor of the nose. Then after the septum is shoved over and the angle reduced to a straight line, begin the resection over this point at the top of the septum. There less adhesion will be found and you can get past the line of the angle and dissect from above downward, keeping the little finger in the originally obstructed nostril so as to keep the septum as nearly in the median line as possible and the finger is also kept directly over the wide blade of the separator. In this way you will avoid perforation and do away with all triangular dissection instruments. If the mucous membrane is dissected back of the apex of the angular deflection you are now ready to use the swivel-knife for the removal of the cartilage. Personally, I prefer to start at the floor of the nose, cutting the cartilage free back past the point of the greatest deflection, then, instead of carrying it up to the highest point of the cartilage, I cut diagonally toward the tip of the nose; this removes a triangular piece of cartilage, but leaves the upper portion of the cartilage for nasal support. I have had no trouble with a tendency of the remaining portion of the cartilage to deflect either way. It is not necessary to use any intranasal tube or splint for support. The only wound that has been made is the one in the open nostril almost at the junction of the skin and mucous membrane. In order to hold the mucous membrane in place, I always put in three or four sutures, allowing them to remain from two to four days.

As you can readily see, there is no injury done to the mucous membrane, and this lessens the tendency to ulceration. As I said in the beginning, this paper has only to do with this particular kind of deflection. I certainly do not agree that the entire cartilage should be resected, and as I have seen evidence of the tendency of the drooping of the nose when the entire cartilaginous support has been removed. In this method the support is still retained and the primary object of the operation, that of establishing nasal breathing, has been accomplished. Another great advantage is that very few instruments are required, as I have repeatedly successfully performed this operation by the use of a cutting blade for the first incision, Allis dry dissector, dural separator, nasal dilator and the swivel-knife, occasionally using the small alligator biting forceps for the removal of small pieces of cartilage.

1517 Walnut Street.

MODERN PROCEDURES IN EXCISION OF INTRINSIC MALIGNANT GROWTHS OF THE LARYNX.*

BY J. SOLIS-COHEN, M. D., PHILADELPHIA, PA.

Modern procedures exclude all attempts at intralaryngeal extirpation of intrinsic malignant growths of the larynx as virtually futile, except under fortuitous conditions not to be expected. Hence, direct access from the exterior is to be practised in consonance with general surgical principles.

This procedure comprises a central division of the thyroid cartilage, and sometimes of the cricothyroid membrane, cricoid cartilage or even of the trachea, as may be requisite to fully expose the morbid mass and its immediate surroundings when the wings of the thyroid cartilage are separated with retractors or with stout loop ligatures.

This may be done under either local or general anesthesia, and with or without precedent tracheotomy; the choice being dependent in great measure on the location and apparent extent of the neoplasm, and in part on the predilections of the operator.

For many years the writer's preference was for prophylactic tracheotomy several days in advance of the main operation, in order that the patient might become accustomed to the presence of a canula, the retention of which might be requisite for an indefinite period. This opinion, however, has been proven erroneous. Prophylactic tracheotomy is not requisite except where strong indication exists for the precautional use of a tube after operation.

The operative and postoperative technic has become so simplified of late, that the tracheotomy safety tube may be permanently withdrawn in most instances when the operation has been completed. Nevertheless, a properly prepared canula should be at hand for prompt introduction should contingencies arise requiring it. In such instances as seem to demand retention of a canula, a fresh one should replace the tube used during the operation.

Forty years ago, the writer reported¹ the extirpation under ether of a fibroid growth from the interior of the larynx under access by thyrotomy without any tracheotomy whatever; and on the seventh day the patient, a journeyman shoemaker, was working at his last;

* Read at the Twenty-ninth Annual Congress of the American Laryngological Association, Washington, D.C., May 7, 8 and 9, 1907.

¹ *New York Med. Rec.* 1867, p. 218.

having been able to sit up within less than twenty-four hours after the operation, and to take a walk in the street upon the fourth day. In this case, as in most of the few other cases upon which the writer has operated, the growth was removed with forceps and scissors; and no stitch whatever was taken in the thyroid cartilage or in its perichondrium.

The immediate technic of operating most in vogue at present is to begin under chloroform inhalatory anesthesia with an incision through the skin from hyoid bone to some distance down upon the trachea. Then a tracheotomy is performed and a tampon canula inserted. The thyroid cartilage is then thoroughly exposed and divided in the median line with bistoury, saw, scissors, or cutting pliers. The wings of the thyroid are separated with retractors or with strong ligatures; cocaine solution is applied to the interior of the larynx to control reflex movements, which otherwise are often very embarrassing during the dissection; adrenalin solution is subsequently applied to contract the bloodvessels and lessen the immediate hemorrhage of the excision, while at the same time it facilitates definition of the growth. Under careful retraction of the sides of the larynx, with the best available illumination whether natural or artificial, the entire diseased tissues are exposed to vision, and removed with a surrounding zone of healthy tissue sufficient to secure the patient immunity from immediate recurrence *in situ*.

The writer continues to prefer his own method, which is to begin with an ordinary tracheotomy in the first place if the patient is not wearing a canula already, and, after introduction of the canula, to incise the skin only so far as to uncover the larynx; thus leaving intact a broad bridge of skin above the canula. This lessens considerably the dimension of the external wound and favors reunion in the sequence. Should due exposure of the morbid parts require it, this bridge can be cut into, or be sacrificed entirely, but in the majority of cases it can be spared.

Tracheotomy having been performed, a tampon canula is to be introduced to occlude the upper portion of the trachea; preferably Hahn's sponge covered canula kept in an aseptic solution during the early steps of the operation so as to moisten the sponge. According to conditions, some little time, usually ten to twelve minutes, will have to elapse before the sponge becomes swollen sufficiently to fulfill its purpose and occlude the trachea from the entrance of blood. This time is utilized in exposing the thyroid cartilage, and getting it ready for division.

Hemorrhage having been controlled, the thyroid cartilage is divided in the middle line with strong obliquely bent short cutting pliers, the lower blade being first thrust through the cricothyroid membrane and passed up to the incisure. In young people, a stout bistoury will suffice. The wings of the cartilage are then held asunder with retractors, firmly but gently, and if the exposure be insufficient for careful manipulation, the cricothyroid ligament and, if necessary, the cricoid cartilage may be divided to afford the required access to the parts. These parts being duly exposed, the interior surface of the larynx is freely mopped with a solution of cocaine until the reflex movements are under control, and then the morbid mass and half an inch or more of surface around it should be mopped with a solution of adrenalin to diminish hemorrhage and define the growth. When saliva and mucus flow too rapidly in the larynx for control with mopping by an assistant, a tampon secured to a ligature for easy withdrawal can be pressed into the power part of the pharynx so as to occlude it and absorb the secretions. In the few instances operated upon by myself this tamponing has not been necessary.

Bleeding and secretions being under control, the excision can be begun. The usual method is to surround the parts to be removed with an elliptic or oval incision down to the perichondrium, and so excise the mass with scissors or bistoury as to remove it together with the underlying mucous membrane, and then carefully scrape the perichondrium and apply an escharotic. My own preference is, when practicable, to strip the inner perichondrium from the wing of the thyroid cartilage under the entire surface of the parts to be removed, raise the mass intact and sever it with serrated scissors at a distance, as far as may be, of about half an inch from the growth which is left untouched by any instrument, so that it is removed in one piece looking like a miniature mass of flesh upon a fleshy plate. If the growth be located in the anterior or central portions of the half of the larynx, the denudation of the internal perichondrium can be begun from in front with an elevator or a dull pointed dry dissector such as Allis's, which is then worked underneath until the whole of the portion to be severed has been raised from the cartilage. In cases where the growth is too far removed from the line of the thyrotomy incision, the elliptic incision to surround the growth may be made so as to extend through the perichondrium, and the perichondrium can then be attacked at the most accessible point, first with a sharp elevator and then with the blunt dissector.

After the removal of the morbid mass and the drying of the parts, the raw surface is thoroughly mopped with compound tincture of benzoin, and the wings of the thyroid are allowed to reapproximate. The tampon canula is now withdrawn from the trachea; and if breathing be comfortable no attempt is made to introduce another canula unless contingencies arise for it in the after treatment.

Should the adjustment of the wings of the thyroid cartilage be accurate there will be no necessity for taking stitches in the cartilage or in the external perichondrium to keep them in place. The natural resiliency will suffice, for cough occasions less disturbance than is theoretically surmized. Should the wings of the cartilage override, however, it will be necessary to insert sutures to keep them in correct apposition.

In my own practice, no stitches are taken in the skin wound. Instead, a longitudinal strip of perforated plaster is placed along each side of the neck an inch or so from the line of incision, and then this plaster is sutured in several places through the perforations, along the line of thyrotomic incision, and tied only so tight as to bring the severed edges of skin into gentle apposition, and leave the wound free for easy and immediate inspection. No threads are passed over the line of the tracheal incision, which is left bare to favor expulsion of matters from the air passages. A pad of gauze moistened in bichloride or other antiseptic solution is then placed upon the wounds, while a broad strip of aseptic gauze is doubled over a narrow strip of adhesive plaster and secured to the neck, so that the gauze hangs down over the dressing upon the seat of the wound. In this manner, there is no strain upon the skin from stretching of sutures, and the parts are readily accessible to inspection and manipulation.

The bed of the patient should have the foot portion raised so as to insure the flow of secretions towards the mouth and away from the air passages, and be so maintained as long as necessary. The patient should be placed near the edge of the bed, lying upon the side of operation, and without a pillow under the head. When thirsty, an attempt may be made to draw sterilized water up into the mouth from a bent tube inserted at its lower edge. This will sometimes be practicable within a few hours, and then suitable nourishment can be administered in the same way until cicatrizations are sufficiently advanced to allow the use of more solid food. Should this plan be impracticable, nourishment should be administered by the bowel for a short time, or until deglutition becomes safe.

The post-operative treatment is as important as the operative procedure, and therefore the operator or a sufficiently skilled as-

sistant, should be within immediate call at least during the first twenty-four hours to combat any adverse conditions which may arise, although it will often be the case that nothing untoward does occur. But when anything untoward does occur, the presence of some one able to meet the emergency may be a matter of vital importance. Should it become necessary for any reason to reintroduce a canula into the trachea, which has to be maintained for several hours or longer, some method for moistening the atmosphere near the head of the bed should be provided, if necessary, to prevent the secretions from dessicating, and a piece of moistened gauze can be kept over the orifice of the canula. The external parts are treated on general surgical antiseptic principles, and although cicatrization by granulation is to be more or less expected, a large extent of the external wounds often heals by first intention, sometimes comprising the entire thyrotomic portion, thanks to the absence of constricting strictures even in the upper portion of the cutaneous wound, and to the bridge of tissue preserved between the incisions for tracheotomy and for thyrotomy.

Under favorable conditions, the patient should be able to sit up in three or four days, and to be practically recovered from the operative procedures in from two to six weeks.

In the description of this method, it will be observed that much has been learned from the experience of M. Butlin and Sir Felix Semon as reported during recent years; especially the preference of preliminary to prophylactic tracheotomy, the use of the loop of ligature in spreading aside the wings of the thyroid when the retractors are insufficient, and the removal of the tracheotomy canula immediately after the extirpation of the growth and attention to the wound of excision.

The retention of the skin bridge between the incisions for tracheotomy and for thyrotomy, the removal of the growth in mass upon a plate of excised perichondrium and superjacent tissue, the dressing with compound tincture of benzoin, the avoidance of sutures in the cartilage and in the skin, and the special method of loosely approximating the edges of the incisions together are the chief points of variance from usual methods in the practice of the writer.

1824 Chestnut Street.

NON-RECURRENT CARCINOMA OF THE LARYNX REMOVED FROM THE NATURAL PASSAGES.*

BY E. FLETCHER INGALS, M. D., CHICAGO, ILL.

The results of treatment in carcinoma of the larynx are generally so bad that it is a pleasure to be able to report a case in which there has been no recurrence of the growth for over a year after its removal by endolaryngeal methods, even though nothing in the operation or treatment of the case can be presented as of special interest.

The patient, K. P., was a laborer 44 years of age, who came to me on the 2nd day of January, 1906, complaining of marked hoarseness which had lasted for 6 years. There had been no pain until within the previous three weeks during which time he had suffered some pain in the region of the left half of the hyoid bone. He was not conscious of having taken any cold but stated that he had had catarrhal symptoms for some time and that the nasal cavities had often been obstructed although at the time of his visit they were better. His general health was good. There was no dyspnoea, the appetite and digestive organs were normal. He stated that the hoarseness had been variable; sometimes having been so bad that he could talk only in a whisper, at other times his voice was much stronger, but continually hoarse. There was nothing in the hereditary history to account for the condition and there was no evidence whatever of lues. The patient's habits were good; he had formerly smoked tobacco but had given it up three weeks before he called upon me and had never been accustomed to inhaling the smoke. He stated that his usual weight was 165 pounds and he weighed 163½ at the time of his first visit. The temperature was normal, pulse 68, regular and normal. There was hoarseness and a slight hacking cough, but no dyspnoea. Upon inspection, I found the nasal cavities about half closed by swelling of the turbinated bodies but this gave him no inconvenience. There were no thoracic symptoms. Inspection of the larynx showed a pinkish gray tumor involving the anterior five-sixths of the left vocal cord filling the opening of the ventricle and extending inward so as to considerably obstruct the glottis, and crowding outward into the ventricular band.

* Read at the Twenty-ninth Annual Congress of the American Laryngological Association, Washington, D.C., May 7, 8 and 9, 1907.

This was about 15 m. m. long by 8 m. m. wide and apparently about 6 m. m. in thickness. Some blackish areas on the surface were apparently caused by coal soot. The growth had the appearance of malignancy but it had been present so long that I hoped it might be a simple papilloma. I removed the greater part of it at the first sitting and submitted it to Prof. E. R. LeCount of Rush Medical College for examination. After the operation I directed the patient to keep an ice pack on the neck for 24 hours. He returned two days later, and at that time I was able to see the greater part of the left cord perfectly, but a small part of the growth, about 6 m. m. in diameter, remained at the front end of the cord and a piece something smaller at the back end. At this time I removed all remnants of the growth from the back end of the cord and about half of that from the front end, but could not secure all of it because of the bleeding. The patient returned two days later, at which time he complained of considerable soreness of the larynx, therefore I merely applied a mild solution of zinc sulphate. A similar application was made at the next visit two days later. I did not see him again for a week. In the meantime, I had received a report from Prof. LeCount that the neoplasm was a slowly growing carcinoma with growth toward the surface and considerable Kerato-hyalin transformation of the epithelial cells. At this time I found a growth at the anterior end of the left cord larger than at the last visit, which I removed thoroughly with a special Mackenzie forceps. After removing this, I found there was a growth of about the same size just below the vocal cord. This I also removed with Mackenzie forceps. I again advised the cold applications to the throat. When he returned four days later he was very hoarse. There was about 15% congestion of the left cord and about 5% of the right. Some roughness of the edge of the left cord which had been noticed at a previous visit had disappeared and no remnants of the growth could be discovered. A mild astringent application was again made. When I again saw him, eleven days later, the left cord was still swollen and the congestion of both cords was a little more pronounced than it had been at the previous visit. I gave him a small inhaler charged with 5 grains of iodine and 20 grains of menthol, which he was directed to use 5 or 6 times a day. This he continued for several months. Two weeks later, there had been no reappearance of the growth but the congestion in the larynx was still more than when I had last seen him. He stated that he had just suffered an attack of influenza, which probably accounted for the increased inflammation. I di-

rected the inhalation to be continued and made a mild astringent application to the larynx. I saw him again in a little over three weeks, at which time the congestion had considerably diminished. Three weeks later, the voice was noted to have been clearer and the patient stated that he was at his regular work daily. I did not see him again for a little over two months, at which time it was noted that the voice was continually growing clearer and he stated that he could sing, something that he had not been able to do before for many years. The cords, however, were still congested about 8% and both of them were slightly thickened. There was no return of the growth. I did not see him again until Jan. 28, 1907, over a year after the operation. He had been on the Pacific Coast for several months and stated that for the last 3 or four months his throat had been perfectly well. His voice, he said, was as good as it ever had been. I found no evidence of return of the growth. In response to a letter, he called again on the 14th of February, at which time he stated that the voice continued as good as ever. But I found that there was slight thickening of the vocal cords and congestion of about 15%, apparently due to a recent cold; however, there was no evidence of any return of the growth.

Although interference with malignant laryngeal tumors is likely to stimulate their growth, it appears to me that when there is doubt of the pathology and conditions are such that we have a hope of removing the neoplasm thoroughly by the endolaryngeal method, this operation should be chosen. If microscopic examination reveals malignancy and the tumor speedily returns, laryngotomy or laryngectomy should be at once advised if there is reason to believe that a thorough removal can be effected. By adopting Dr. Cohen's operation, I believe we shall be able to save many patients by early laryngotomy.

34 Washington street, Chicago.

FAVORABLE EFFECT OF TRYPSIN IN A CASE OF LARYNGEAL EPITHELIOMA; EXHIBITION OF CASE.*

BY HOMER DUPUY, M.D., NEW ORLEANS.

James O'Brien, white male, age 59. Personal history excellent up to December, 1905, when he became very hoarse, which condition persisted during the rest of the winter and into the spring of 1906; he attributed it to a cold. On May 26, 1906, patient presented himself to me for examination. Laryngoscope disclosed a growth in the anterior commissure of the larynx. Its point of origin was subglottic and to the right side of the median line. It was firm and pale in appearance and in size approximated an averaged sized pecan. There was a shadow of doubt as to its neoplastic nature, and even with a negative history of syphilis, he was put on the iodide of potash, 50 drops three times a day and protoiodide of mercury one-quarter grain, for a period of four weeks without any perceptible impression on the growth. He consulted another physician and during June and July local treatment in the form of spraying was resorted to. He returned to me about August 4th, 1906. The growth seemed to have increased and, in fact, protruded into the glottis anteriorly. Malignancy was suspected and thyrotomy advised.

On August 15, 1906, at the Eye, Ear, Nose and Throat Hospital, I opened the larynx by an external operation and found a greater extension of the growth than was at first revealed by the laryngoscope. The anterior third of the right true and false vocal cords were involved. The growth seemed to arise from the right ala of the thyroid cartilage, near the median line along the anterior commissure. These involved structures were excised and thorough curettage practiced at the point of origin over the cartilage. While I regarded the case as one of the intrinsic variety, that is, in which the neoplasm is limited entirely to the interior of the larynx, its situation so near the median line made me fear recurrence on the opposite side. This actually occurred and by the middle of September, 1906, a month after the operation, the growth presented on the left side and progressed rapidly.

A specimen of this growth, obtained at the time of the thyrotomy, was examined microscopically by Dr. John J. Archinard, who re-

* Read before the Orleans Parish Medical Society, New Orleans, March 23, 1907.

portend it to be epithelioma, polyhedral in cellular arrangement. While I was seriously thinking of performing a total laryngectomy, I hit upon the idea of giving trypsin a trial. Before initiating this treatment, Drs. Gordon King, A. B. Gaudet, DePoorter and E. S. Keitz, severally, made laryngoscopic examinations. This was done to secure separate, corroborative and impartial evidence in noting the progress of the case. The first injection of trypsin (Fairchild's) was made October 27, 1906, a whole ampoule being used. A whole ampoule, or 20 minims, was used at each injection during the treatment. After the thirty-seventh injection, trypsin was discontinued and Holadin (extract of pancreas) given in capsules, 3 grs. each t. i. d. After a few days this was increased to 4 and 5 capsules a day. Holadin was thus given for 29 days. On January 21, I returned to the trypsin, giving 11 injections during that month. On February 1, I discontinued trypsin and returned to Holadin, giving the same dosage. February 18, trypsin injection was resumed, 12 injections being given from this date to March 4, when Holadin was again taken, to March 21.

It will be noted that I alternated in the use of trypsin and Holadin, the latter being given to reinforce the action of trypsin.

In all, to date, he has received 55 ampoules, or 1100 minims, of trypsin; 290 capsules, or 890 grs. of Holadin.

The injections were given hypodermically, first in one arm and then in the other, and so on exclusively. No severe systemic reactions were observed which could be directly attributed to the trypsin. During the first fifteen days of the treatment there were temperature variations ranging from 99° to $99.4-5^{\circ}$. Locally, the site of the injections sometimes showed some inflammatory reactions, without any suppuration. The injections were usually followed by burning sensations, more or less severe in character, but evanescent in duration.

Now, as to the changes in the growth: On the 12th of November, 1906, 16 days after the first injection, the growth appeared pale and harder, and had distinctly diminished one-half in size. After this observation, with the exception of marked pallor, no further change appeared in the growth until December 7, 1906 (41 days after initial injection), when the laryngoscope showed it to have still further diminished, as it no longer protruded into the glottis, but remained sub-glottic. These alterations continued until about January 21, when the laryngoscope gave the grateful information that the tumor

was no longer visible. This observation was confirmed by the visiting staff of the hospital.

It is now over two months without a sign of recurrence having set in. The remaining laryngeal structures appear normal. The patient naturally possesses a very husky voice, the result of a complete operative removal of the right vocal cord. His general condition is excellent.

Drs. Gordon King, A. B. Gaudet, DePoorter and E. S. Keitz re-examined the larynx March 22 and all concur with me that the tumor has totally disappeared.

The case presents some very interesting features: The situation of the growth in an accessible region brought it within a splendid field for frequent and exact observations. Its limitation to the inner structures of the larynx, without involvement of the related lymphatic glands, undoubtedly contributed to the favorable results. A thyrotomy disclosed the extent and malignant nature of the growth. Its rapid recurrence, the positive microscopic findings by Dr. John J. Archinard, and the laryngoscopic examinations of several competent witnesses, insures a correct diagnosis and safeguards the observed results. The absence of severe systemic reaction is worthy of note. It was the absence of these untoward effects, which Beard attributes to the toxin absorption, when the cancer cells are broken up by the trypsin, which made me desist from the use of the amylopsin preparations. We had best consider this as only an apparent cure, further extension of time being required to confirm the brilliant clinical results thus far obtained. The case is reported on its own intrinsic merits. It certainly encourages the trial of trypsin in selected cases. In these pioneer medical applications, we can only reach definite conclusions by the accumulation of personal experiences and mine may be an incentive to others.

N. B.: I will report further on this case, be the results favorable or otherwise.

141 Elk Place.

THE FRONTAL SINUS OPERATION.

BY MAX HALLE, M. D., BERLIN.

To the exceptions¹ which Dr. Ingals has taken to certain points in my paper,² and which he kindly sent me before their publication I desire to make the following reply:

The sentence "In the first place, it is a question whether the nasofrontal duct can be probed in a living person," as is seen from the context, is on the one hand a rhetorical question, and on the other takes into account the possibility of objections from other sources. In my paper, not only in the sentences immediately following, but also in subsequent paragraphs, I have definitely stated as my opinion that in nearly all cases of chronic empyema of the sinus frontalis the duct can be probed. In this, therefore, I agree perfectly with Ingals.

That I have not quite understood his method of opening the frontal sinus is correct only in so far that I have had a more favorable opinion of his method than I can now have after his recent explanation. I had assumed that Ingals, like myself, used a thin, flexible probe which was permitted to slide, as it were, of itself into the nasofrontal duct after having been bent to suit the naturally existing anatomical peculiarities. Ingals, however, used stiff steel probes which are bent in two definite positions, undoubtedly suitable, and with these he tries to reach the entrance to the frontal sinus. In a number of cases, he will certainly enter the duct smoothly; in others this will not be accomplished so easily, and in these difficult cases he will have to use more or less force. The danger of this, however, cannot be sufficiently emphasized. As the tabula interna is not infrequently very thin and the posterior wall of the sinus often extends low down (Fig. 1, a.) the possibility of injuring the dura is exceedingly great unless flexible probes are used, which bend to suit the anatomical conditions which may be present. The sad experiences of Schaeffer and others may be mentioned here.

Moreover, I had understood that Ingals, after sliding the drill over the probe, pulled the latter firmly to the front, on the one hand to remove as much as possible of the spina naso-frontalis interna as

¹ THE LARYNGOSCOPE, April, 1907, p. 284.

² THE LARYNGOSCOPE, Feb. 1907, p. 115.

far as it forms the lower and partly the anterior wall of the sinus,³ on the other hand to avoid the great danger that the drill which, according to Ingals' measurements, has a radius of 3mm., injure the tabula interna, directly upon which the probe in the sinus rests. If Ingals has met with no accidents in his cases, it is to be considered especially fortunate, since the stiff probe practically forces the drill to work upon the tabula interna against which it lies.

Finally Ingals, with his method, obtains an opening of only 6 mm., which is curved to correspond to the bend of his probe. This opening, moreover, is sufficient for a short time only, as all internal open-

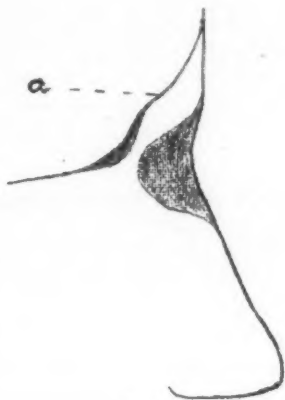


Fig. 1.

ings tend to close very rapidly. Furthermore, it never permits the operator to gain a view into the frontal sinus to inform himself of its conditions, though this is of the greatest importance for the further progress of the case.

My method presents the following important differences from that of Dr. Ingals:

(1) Ingals uses stiff probes, with which he forces an opening, if necessary; I use flexible probes which shape themselves to suit the anatomical conditions.

(2) Ingals slides his drill upwards along the curved probe, and cannot see at all what injury may, perhaps, be done with the drill

³ At this point in my article there is an error in translation. In *THE LARYNGOSCOPE*, Feb. 1907, page 124, line 11. "for the anterior wall and the floor" read "the anterior wall or the floor", meaning that part of the anterior wall which forms the floor of the sinus.

posteriorly. I slide a protector over the probe, along which I proceed with a straight drill, so that I can see my work at all times and avoid all danger to the tabula interna or the orbit.

(3) Ingals obtains a narrow opening, which permits no view and must soon close itself. I get an opening corresponding to the entire breadth of the spina naso-frontalis interna, up to 3 cm., and can survey the frontal sinus to a large extent during the operation and for a considerable time afterwards.

Regarding all further particulars I refer to the original, in which all anatomical conditions and all possible objections, those of Ingals included, have been considered.

In closing I do not wish to omit the concession that Ingals has done very meritorious work in the effort to gain an internal opening into the frontal sinus.

Wilhelmstr., 146.

The following corrections should be applied to Dr. Halle's paper in *THE LARYNGOSCOPE*, February 1907, page 115.

1. Page 118, Maxillary Sinus, line 2; for "favorable" read "unfavorable".
 2. Page 120, line 9; for "periosteum" read "bone and nasal mucosa".
 3. Page 120, line 10; for "safety valve" read "valve or sail valve".
 4. Page 120, line 12; for "some time" read "a long time".
 5. Page 121, line 3; for "side or back" read "side and back".
 6. Page 121, line 6; for "Fig. 3c" read "Fig. 3d".
 7. Page 123, Ethmoid Sinus, line 7; for "treatments" read "operations".
 8. Page 124, line 11; for "and" read "or".
 9. Page 124, line 13; for "Figs. 1 & 2" read "Figs. 1 & 4".
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A BLUNT AND A CUTTING LARYNGEAL DILATOR AND A SELF-ACTING EPIGLOTTIS LIFTER.*

BY J. W. GLEITSMANN, M. D., NEW YORK.

The blunt dilator consists of a handle, to which are attached two parallel rods with a prolongation at right angles for insertion into the larynx. They form at their upper distal end a triangle, into which fits a heart-shaped piece, fastened to the third rod underneath, the movements of which are controlled by a ring for the finger. When the latter is drawn to its full extent towards the operator, the two stationary rods separate, and all three conform now to the natural shape of the glottis and are capable of dilating soft structures for inspection of the lower parts and temporary relief of dyspnoea.

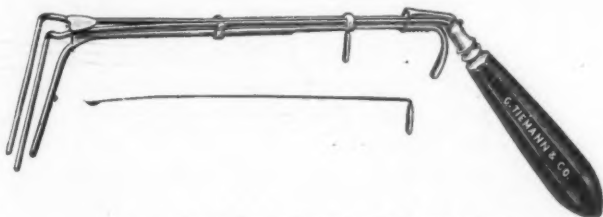


Fig. 1. Author's Blunt and Cutting Laryngeal Dilator.

The cutting dilator is intended for the severance of webs and of adhesions of the cords. It is constructed on the same principle as the blunt dilator, but the two upper rods are worked by a ratchet, which holds them in a firm position and allows the free use of the finger to develop the cutting knife. The latter is concealed in a small groove running the whole length of the third rod, and when drawn forward by pulling the hook to which it is attached, cuts easily through the obstruction, which is held in tension due to the spreading of the two other rods.

The epiglottis lifter, which I devised several years ago, was, in my belief, an original idea, till I searched a number of old publications at my command to learn what kind of instruments for this pur-

* Demonstrated before the Meeting of the Laryngological Section of the New York Academy of Medicine, March 27, 1907.

pose had been published previously, before demonstrating it to the section. I found that Tuerck and L. von Schroetter already had described similar instruments, although of a more complicated construction. But I could not see any mention nor drawing of their instruments in seven European and in no American catalogue of instrument makers. This circumstance and the fact that the instrument enabled me to make a correct diagnosis in one case and to perform an operation in another, which otherwise could not have been made endolaryngeally, tempted me to reproduce it.

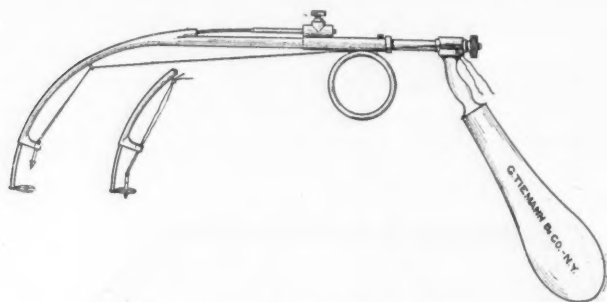


Fig. 2. Author's Self-Acting Epiglottis Lifter.

The accompanying drawing will greatly facilitate the understanding of its mode of action and make a lengthy description unnecessary. The cone-shaped needle has a hole at its base for the thread and a small needle in the middle, which prevents its slipping back after it has been pushed through the epiglottis and passed through the opening between the two springy plates. When the plates are now moved forward, the epiglottis hangs on the thread, the needle as well as the whole instrument can be withdrawn, and the thread with the epiglottis attached to it, be handed to an assistant, allowing the operator the free use of both hands.

616 Madison Street.

NEW ANTRAL CHISELS, WITH BRIEF REFERENCE TO TECHNIQUE IN OPENING THE MAXILLARY SINUS.*

BY ARTHUR M. CORWIN, M.D., CHICAGO.

We have come pretty well to understand that in case of long standing chronic suppuration of the maxillary sinus with extensive necrosis, granulation, polypi, cysts or new growths, the best procedure is a radical one permitting free inspection, palpation and use of instruments to eradicate the disease, preferably the Caldwell Luc operation as we know it or better still perhaps, its more recent refinement as devised by 'Denker and described so well by 'Dr. Stolte at our February meeting of last year. It is equally true I think, that while in some 15 or 20 per cent of cases such radical interference is needed, in the vast majority of chronic suppurating maxillary antra, these measures are unnecessary and therefore to advise them is seemingly poor judgment, and to do them, bad practice.

In rare cases of highly excitable and nervous patients at least partial or transient general anaesthesia, whether demanded by the patient or not, is humane. But if this cavity can be opened and treated efficiently through the naris under local anaesthesia with little if any pain or shock or hemorrhage and no terrifying sense of a severe operation, it seems inexcusable to subject the patient to the greater danger and the after discomfort, etc., of the radical procedure.

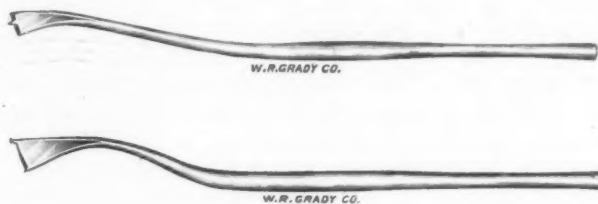
Is the idea of the nasal opening of this cavity an old one? It is perhaps all the more remarkable that only since 1900 has the naso-antral route for curettment, packing, drainage and ventilation found its definite place and come to be recognized as the route of election for the relief of chronic suppuration. 'Boeninghaus as early as 1892 had opened through the facial wall and 'Janssen in 1894 followed a similar plan. Hajke in 1899 and many others contributed confirmative articles and refinements of technique. 'Caldwell had in 1893 published the modest report of his new operation, which was to remain almost unknown until Luc's work and reports in 1896, '97 and '98. Spicer before the British Medical

* Read before the Chicago Laryngological and Otological Society, February 19, 1907.

Association in 1894 had advocated entrance by the facial route and just missed the glory of Caldwell and Luc in making a small counter opening through the outer nasal wall by throchar, without closing the facial wound.

Today the dictum is fairly fixed in our operative code, that as the antrum is normally in communication with the nasal cavity, permanent drainage, where necessary, should be made by that avenue and not into the more infective mouth. So that the ancient Meibom Cooper operation through a tooth socket, so long the chief property of dentists, and I had almost said a reproach to our profession, has finally received its tag and number and already gathers dust among rhinologic relics of the top shelf. Yet dentists still do it. The sacrifice of sound teeth for antral drainage as practiced a very few years ago is now very bad practice and alveolar opening is only to be tolerated transiently in the removal of diseased roots and necrosed bone in their vicinity, a counter opening through the nose, or facial wall and nose being made if cure is not affected within a reasonably short time. The same ban has been placed upon the so-called DeSault, Krüster method of prolonged opening for drainage and packing through the canine fossa, or any of the modification of this,² such as the operation of Kretschman and others, with or without counter opening through the nose. The nasal route to the antrum through a large opening but without resection of the anterior facial wall was advocated by Rethi some ten years ago following Zuckerkandl's suggestion to open through the middle meatus. So also we have others associated with drainage through the middle meatus, which procedure was no doubt suggested by the normal fragilness of the "nasal fontanelle." But this school of operators, would seem to sacrifice good drainage, the chief desideratum, to ease of operating; and the results are correspondingly uncertain and unsatisfactory. Mere puncture by trochar, drills, trephine phine or trochar chisels as we practice it today following the lead of Krause and Friedlander is of diagnostic value for cleansing purposes in acute or mildly chronic cases or where the antrum has been for a short time simply a receptacle for pus overflowing from the frontal or ethmoid sinuses. But as a cure in chronic suppuration it is on a par with the alveolar route or irrigation through the normal or accessory meatus. Mickulicz was the first I think, to utilize the inferior meatus way to the antrum for free access.

R. Claoue of Bordeaux stated the operation in definite terms using trephine and forceps but confining the window to the inferior meatus. This was in reality but a modification of the procedure of Dr. L. Rethi of Vienna as described by him in 1901. This so far as I can find is the first presentation of the principle of a large permanent opening between nasal cavity and antrum reaching to the floor so as to give free ventilation and perfect drainage without a facial opening. He removed the anterior two-thirds of the inferior turbinate under 20 per cent cocaine and with gouge punctured the antrum, enlarging the area resected till it embraced the anterior part of both middle and inferior meatus without injury to the naso-lachrymal duct. To Rethi then are we indebted for this epoch making operation which has been done with slightly varying technique and good results by many in the last five years, notably Coakley 1902, Holbrook Curtis 1903 with trephine and burr, Escat 1904, Freer 1905 with trephine and burr or forceps.



It is my desire to add my testimony to the value of the Rethi operation and to emphasize its teutonic origin in both principal and essential technique. Incidentally I bring to your notice two Antral Chisels which I have found very helpful in performing the operation. I fancy these are unique in form though the use of the chisel is not a new idea in this field. These were patterned after models made from aluminum wire flattened at the end and bent as indicated in applying them to the nasal passage of a patient upon whom I had previously operated with trephine and forceps. The aim has been to obtain such curves in them as seem to be required in the average case. One is for making vertical cuts, the other for horizontal cuts. The total length of each is $5\frac{1}{2}$ inches, the blades about 1-3 of an inch wide, bevelled one way. They are used in either naris with equal facility. The vertical blade has a sharp

spike 1-16 of an inch long at its centre; the horizontal has a similar prong at each end of the cutting blade. These spikes rapidly penetrate the bone with a tap of the mallet fixing the position of the blade so that it does not slip as it otherwise would without them, for they necessarily attack the surface in a direction slightly off the right angle. Delicate enough to be applied easily under inspection, the shafts are sufficiently stiff to allow their being malleable just above the blade so that they may bend a little if need be to suit the case. However, I have found no cause for changing their curves in the six cases upon which I have used them successfully and Dr. E. F. Ingals has also employed them with satisfaction in two cases. The shaft is flattened in a plane parallel to the plane of the cutting edge which enables one to control the direction of the blade with precision. Each instrument has a double bend so that the force applied by the mallet to the handle is transmitted to the blade in another plane nearly parallel to it.

The inferior meatus as chosen by Claoue has appealed to me as offering an area sufficiently large in most instances for the establishment of an effective opening. The exception might present in those rather rare cases in which the laterally contracted, high arched palate, deep thick alveolar process, and narrow face, occurring in women oftener than men, suggest the presence of abnormally small antra with high floors approaching the level of the middle turbinated or at least above the level of the nasal floor. This combination as pointed out by a recent writer, is in contrast to the more common type of broad face, wide low palate, vertically shallow alveolus and low floored antrum, occurring most often in men. Careful study of each patient with these data in mind is essential, of course.

The following is a brief description of the technique of their employment. Anaesthesia is obtained by 20% cocaine in 1-1000 suprarenaline solution, applied on swabs with special care to make the application high under the inferior turbinated by small pledgets on slender applicators. Further applications of suprarenalin are made to render the operation in most cases nearly bloodless. Resection of anterior one-half or two-thirds of the inferior turbinated is accomplished by Casselberry or other good scissors, snare and Myles' forceps leaving a narrow flap of mucous membrane which has been elevated from the upper surface of the turbinated along its base. This flap is to cover the stump of resected turbin-

ate and greatly shortens its time of healing. I think the majority of us would avoid the removal of the entire inferior turbinate as recommended by "Chevalier Jackson, M. D., of Pittsburg, and his statement that "most cases renew a functionally sufficient inferior turbinal in a few months and after a year no observer on looking into the nose could tell that a radical turbinotomy had been done" is misleading, to say the least, and not good advice to the young Rhinologist who may read his words. The outer wall of the inferior meatus exposed by the partial, anterior turbinectomy is then compassed by three incisions, one immediately below the stump of the turbinal and two vertical, in front and behind. The membrane enclosed by these is quickly and easily separated by a bent elevator and remains as a flap attached below and lying on the floor of the naris. A square or quadrilateral of the bony wall is next removed with the chisels. The anterior, lower, upper and posterior cuts being made in that order. The edges of this window may be further bitten off with forceps or chiseling according to the indication. The ridge below should be removed as far as possible, making the floors of the naris and antrum continuous. The cavity is irrigated through a bent aluminum tube with hot normal salt or other solutions suggested. The interior of the sinus is examined with a flexible bent probe. Such curettage is done as may be indicated. But especially the mucous membrane on the floor of the antrum up to the wall is removed. After further cleansing the flap of mucous membrane may be trimmed as small as need be and pushed through the window. Covered by a narrow strip of gauze, dusted with bismuth and moistened in vaseline, an ounce of which has been mixed with 20 minims of Pheno-Camphor (made by mixing equal parts of Camphor and Carbolic Acid.) The rest of the cavity is then packed with gauze of the same sort. The packing may be left for two or three days when it is removed with care to avoid displacing the flap. Further irrigation and loose packing is done as necessary. The successful implantation of the flap depends much upon the thorough curettment of the floor of the antrum, just beyond the window. This step is an important part of the operation as the fixation of the flap prevents closing of the opening by immediate epithelialization of its lower edge. Most of the subsequent care of the antrum is intrusted to the patient who quickly learns to insert an aluminum tube slightly bent at the end and flattened toward the other end to indicate to him the direction of the bend. A good irrigator is quickly and cheaply devised by ordering

4 or 5 feet of small rubber tubing. This can be weighted at one end by tying to it a good sized glass stopper. This is thrown into the receptacle containing the irrigating fluid which is set or hung at the required elevation. A wooden snap clothes pin makes a good cut off and a short section of glass tubing may be inserted into the irrigating end of the rubber tube so that the patient can establish syphonage by suction. The glass tube is then replaced with the aluminum irrigating tube.

Aluminum tubing about 3-16 of an inch in diameter outside may be purchased by the yard from dealers in this commodity. From this may be quickly made proper irrigating tubes by slightly heating to soften one end and giving it the desired curve, having inserted a piece of wire a little less in size than the diameter of the lumen.

The antral chisels were made for me by Grady & Co., 86 Wabash Avenue, Chicago.

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10. *Arch. f. Laryngol. u. Rhinol.*, Berlin, vol. xviii, part 3, 1906.
11. *Muenchen. med. Wchnschr.*, 1905, No. 1.
12. *THE LARYNGOSCOPE*, October, 1906.

34 Washington St.

SOCIETY PROCEEDINGS.

NEW YORK ACADEMY OF MEDICINE.

SECTION ON LARYNGOLOGY AND RHINOLOGY.

Regular Meeting, March 27, 1907.

THOMAS J. HARRIS, M.D., CHAIRMAN.

PRESENTATION OF PATIENTS.

Dr. Abraham presented Mr. H., and Mr. C., private patients, and gave a short history of their cases.

Two Cases of Sinus Disease. By J. H. ABRAHAM, M.D.

CASE I. Mr. H., married, aged 51 years. Consulted Dr. Abraham on February 1, 1907, with the following history: Twenty-five years ago he suffered from a severe attack of nasal catarrh, which lasted three weeks, followed by a profuse left-sided discharge. Ten years later he had another attack on same side. April, 1905, he was struck with a piece of wood over the left cheek bone, followed by severe pain for several days. February, 1906, contracted la grippe and was confined to his bed one week, suffering from pain and profuse nasal discharge, chiefly on left side. The discharge continued till November, 1906, a piece of bone was discharged into his mouth from left cheek bone, followed by a marked odor and increase of the discharge from nose and mouth. Shortly afterwards the opening in his cheek bone closed and this was followed by a thick yellowish and very fetid discharge from left nasal cavity. This condition continued until February 13, 1907, when Dr. Abraham operated upon him by the intra-nasal route under 5% cocaine and adrenalin solution. A small carious piece of bone was removed from the outer surface of the antrum, the cavity curetted of all granulations and treated according to the method to be described in this paper. The patient was discharged cured on March 10th.

CASE II. Mr. C., age 28 years, single. Consulted Dr. Abraham on September 8, 1906, with the following history: About one year ago suffered from an attack of la grippe, with profuse bilateral nasal discharge. Before attack of la grippe he had complained of pain over both cheek bones, which he thought was due to his teeth.

The discharge came from left nasal cavity, but never ran from the right. In July, it became very thick, yellow and of a markedly disagreeable odor. It was necessary to use three to five handkerchiefs a day. On examination it was found that his right nasal cavity was filled with a thick yellowish discharge of a most disagreeable odor. On cleaning the cavity, he found it impossible to examine the spot on account of a large bulky mass which on closer examination he found was the naso-antral wall in the region of the middle meatus. This was incised and a large polyps bulged into the nasal cavity. The polyps was removed and the antrum probed through this opening and he found it filled with polyps and granulation tissues. The patient consented to be operated upon on Oct. 5th under cocaine adrenalin anaesthesia. The intra-nasal operation was performed and the cavity curetted. October 10, ethmoids were removed and found carious. The naso-frontal duct was curetted on account of a discharge from the frontal cell. The frontal and antrum were treated through the nose. The patient made a beautiful recovery and was discharged cured on December 29, 1906.

A Discussion on the Indications for and Advantages of the Intra-Nasal over the Radical Operation in the Treatment of Chronic Empyema of the Antrum of Highmore, and the Technique to be Employed.

- (a) **The Rapid Entrance of the Maxillary Antrum through the Inferior Meatus without General Anesthesia.** By H. HOLBROOK CURTIS, M.D., (*Published in full in this issue of THE LARYNGOSCOPE, page 354.*)
- (b) **The Indications for and the Advantages of the Intra-Nasal over the Radical Operation in the Treatment of Chronic Empyema of the Antrum of Highmore and the Technique to be Employed.** By ROBT. C. MYLES, M.D. (*To be published in full in a subsequent issue of THE LARYNGOSCOPE.*)
- (c) **The Indications and Advantages of the Intra-Nasal over the Radical Operation in the Treatment of Chronic Empyema of the Antrum of Highmore and the Technique to be Employed.** By J. H. ABRAHAM, M.D. (*Published in full in this issue of THE LARYNGOSCOPE, page 357.*)

JOINT DISCUSSION.

DR. SAMUEL LLOYD, in opening the discussion, said that he felt somewhat embarrassed by the fact that the readers of the papers

had suggested three different operations for the one route, and very much astounded at the armamentarium passed around as essential for the performance of these operations. He was also surprised to find that the question of the indications and treatment between the two routes seemed to resolve themselves into distinctive methods of getting in through the nasal route, with a general condemnation of the other operations. He was, however, pleased to note that the alveolar route had not been suggested, though it was referred to as a method of drainage. It is still advocated by the dental profession, but in his opinion should be condemned as utterly incomplete and inadequate. It seemed to him that there could be very little difference of opinion between the question of the nasal or the canine fossa route in disease of the antrum of Highmore in any case where the discharge is due to a hyperaemia of the mucous membrane, and where it is essential simply to obtain a thorough drainage of the cavity and so allow the mucous membrane to get back into its normal condition, by removing the irritating secretions with which it is constantly bathed. It makes no difference where the drainage is placed; and if it can be reached more readily by one method than another in any given case, that is the method of choice for the operator. The operation cannot be outlined for any set of men. One man's facility makes it easier for him to approach by one route than another, and he had better use the operation that comes easiest to his hand rather than to try others that may be more difficult for him.

There were, however, other things to be taken into consideration, which had only been suggested in the papers of the evening. Dr. Abraham had said that caries is infrequent. It is intrequent, but it does occur, and sufficiently often to make it necessary to have full inspection of the antrum. He had himself removed squama from the antra in four or five cases within a short period of time, and in another had taken out the orbital plate. In several, the floor of the antrum was found to be necrosed, due to caries of the teeth; in another case, he had taken out sections of bone started by periosteal conditions. Then, too, there were whole series of tumefactions that need to be treated in the antrum, where it was essential to get to the base of the growth, and cure the point from which it grows. The actual cautery is the best means of handling such cases, and he doubted whether it would be possible to cauterize a papillomatous growth through the intra-nasal route—at any rate not until we can get a much better illumination than he had yet seen.

Another condition that he had found equally important was an antrum which is divided into cavities with distinct septa coming

from the different walls, two or three from above, two or three from the side. These cavities may be more or less filled with mucopus, and the depth may cause a great deal of difficulty in breaking them up so as to secure proper drainage. In such cases it was important that the approach should be made through a large opening, and it could best be made through the canine fossa.

Another point to be considered was the eruption of teeth into the antra. He had removed four or five teeth that had grown into the antrum itself, never having appeared below. It would have been impossible to have removed these through any other route. He had also taken fillings out of the antrum, where the dentist had filled the teeth and it had passed through the roots into the antrum, the composition or filling rolling over the top of the teeth and making a foreign body in the antrum which has kept up the suppuration. These conditions can only be observed by means of the more radical operation.

In regard to the facility of this method, it has been claimed that the cavity is not so easily kept clean as by the other route. Dr. Lloyd said that he did not at all agree with this statement. In the beginning, when the operation is first performed, the packing would prevent the ingress of food, and by the time the patient could attend to it himself he could thoroughly cleanse the antrum. It was an easy matter for him to clear the mouth first with an antiseptic solution and then cleanse the antrum. There is a rapid contraction until we get to a small valve-like orifice that allows exit from the antrum and at the same time renders entrance difficult. He had demonstrated by several patients that the rapidity of closure was fully equal to that of any other method. He does not use iodoform, and seldom packs unless a polypus has been removed, but gets along simply with the primary packing and irrigation of the cavity, and the proper drainage.

DR. BODINE said his experience in this line of work was limited, although it antedated the time when most of those present became acknowledged general surgeons in a special line. Some fifteen years ago he operated upon many cases, but since then they had been, very properly, sent to the special operators in this line. For many years he had not operated upon the antrum, for the reason that the operation was but one step toward the cure, and the after treatment required special office equipment and was long and tedious. He thought that Dr. Lloyd had failed to get the point of discussion as he understood it. The subject was empyaema and not

new growths or conditions which necessitated a wide exposure of the cavity. This infection nearly always came from the nasal cavity, rarely from the roots of the tooth. Of course, if the trouble was due to a tooth, the proper method of cure was to remove the cause; but if it were due to an infection from the nasal cavity, the matter resolved itself principally into the proper method of drainage and ventilation of the antrum. The contention that drainage of any cavity should always be from the most dependent point, was more academic than practical. In contention of this point he would mention the cure of bladder infection by drainage through a suprapubic opening. Another broad surgical principle is to make the punishment fit the crime. A mild infection of the antrum does not deserve to lose a tooth, for such cases generally get sufficient drainage through an intranasal opening. He had been thoroughly convinced of this lately by seeing a case of Dr. Abraham. Assuredly a painstaking, conscientious after treatment is more important than the position of the opening in the matter of cure. Curetting the antrum he believed opposed to good surgical principles. If you are dealing with caries, it is not necessary to curette. While if you are dealing with necrosis of the superior maxillary bone, it cannot be called an empyaema of the antrum, and should be attacked in other ways. He objected to packing the antrum with gauze, especially if the opening had been made through the mouth, because you would drain as much saliva from the mouth into the antrum as you would drain pus from the antrum into the mouth. It seemed to him, in a simple case, that is, a true case of empyaema of the antrum, the best route for drainage is through the inferior meatus of the nose. At least, this operation can be done painlessly with local anaesthesia. He added that he, as well as Dr. Lloyd, had been almost dumfounded at the armamentarium presented for the purpose of performing one simple operation. He had seen more instruments tonight than he has in his whole surgical kit.

DR. BEAUMAN DOUGLASS said that the question before the Section this evening was whether the intranasal route alone presents advantages over the route by way of the mouth, but as the first two papers dealt specifically with a particular operation, and did not discuss the indications or advantages between the two methods, he would pass them by and devote his reply to Dr. Abraham's paper. Dr. Abraham had devoted his comparison wholly to an intra-nasal actual operation and one which is called the canine fossa operation. This later operation is, however, obsolete today, for Dr. Douglass did not know any rhinologists who are doing the operation which Dr.

Abraham described as the canine fossa operation. The operation referred to deserves most *unqualified condemnation*. To leave an opening from the mouth into the antrum, entering through the buccal cavity, is unsurgical and unwise, and so far as he knew no one operating today would do that. Therefore, before discussing the advantages between these operations it would be necessary to say a word in regard to an operation via the buccal cavity which is done today. A horizontal incision is made through the muscle and mucosa and the mucosa lifted from the superior maxillary bone until the entire anterior antral wall is exposed and the infra-orbital nerve is seen; then the anterior wall of the antrum is removed upward to the foramen, downward to the roots of the teeth; posteriorly and externally to the malar ridge,—in other words, the entire bony surface of the anterior wall of the antrum is removed, and ready inspection of the antrum can be made. Now comes the treatment of the antral cavity by more or less thorough curettage, removal of all diseased areas and then closing up the antral cavity by suture of mouth wound after making an opening into the nose by removal of the inner antral wall and a part of the inferior turbinate body, so that at the end of the operation we have both arrived at the same result, only by different ways.

With this operation in mind—not the one which Dr. Abraham had in mind, let us compare this method with the one presented by the reader of this paper in the treatment of antral empyaema. Most of the cases of ordinary empyaema of the antrum of Highmore are curable without operation. Those which are not, and which have been irrigated time and again after puncture, require something more. Such a diseased membrane does not regenerate, for we find such membranes in the chronic polypoid condition, or in a chronic inflammatory condition, or in a condition of necrosis or sloughing. These cases require direct treatment, and these are the cases which come to the surgeon or rhinologist for operation. After he has exhausted his conservative measures comes the question: Shall these cases be approached by way of the mouth, after which an opening is made and the drainage arranged through the nose, or shall the operation be done through the nose? What are the disadvantages of the mouth operation? With fair technique, we have to do only with aseptic conditions. The wound always unites. The only disadvantage of the mouth operation over the nasal route in the work that I have done is the swelling and infiltration of the cheek, which usually occurs after the operation, persisting from ten days to two or three weeks.

An advantage is that the operation is clean. No matter how fine your armamentarium may be, there are certain cases where in operating through the nasal cavity you cannot make a clean operation. In spite of the instruments which had been shown tonight, the operators would probably acknowledge that there is at times more or less after sloughing from the nasal operation, for the bone is broken by the chisel, and small pieces cling to the periosteum within the antrum until they slough off. Such a condition does not occur when the operation is done through the mouth. Furthermore, the mouth operation is very much easier to perform in the hands of the unskilled or the beginner. It is not only easier, but inspection is more thorough and inspection of the diseased antrum is an important matter. Another advantage in the mouth operation is the ease with which the mucosa can be inspected and curetted. Notwithstanding Dr. Myles' experience, there are a number of cases, particularly of the kind where it was partially necrotic where the mucosa requires removal. Personally, Dr. Douglass said that he thought the mucosa ought always to be curetted, and he always does it. If the granulation is limited to a small area, which can only be determined by the mouth method, and not by the intra-nasal operation, of course the healthy membrane was not curetted, but only the granulations. He thought that curettage was a wise part of the treatment, and that it could only be done through the mouth and not through the nose. He thought that the cases operated by the mouth according to the method of Luc would compare most favorably with those operated by the intra-nasal method exploited in tonight's meeting.

DR. DELAVAN said that the method of operating through the nasal cavity was not a new one. It was in vogue in Berlin prior to 1890, and was practiced there by Prof. Hermann Krause with considerable success. Since then many new devices had been offered and new plans of operating had been proposed, but the operation through the wall of the nasal cavity into the antrum seemed to effect the desired end at a minimum of cost to the patient, and to yield fully as good results as any of the other operations performed externally. The operation seldom needed to be as extensive as seemed to have been suggested by some of the speakers. It was quite possible to thoroughly cocaine the cavity and its walls, and to successfully treat the conditions usually found. Of course, it was understood that the discussion did not include the treatment of new growths of the antrum. Such cases would require radical means, far more severe than any called for in the ordinary cases of suppurative disease. In dealing with the latter, however, the speaker

regarded operation by the nasal route as on the whole the best. Speaking of improved instruments for this purpose, it was only necessary to compare the crude trochar and canula formerly used with the admirable drills exhibited by the reader of one of the papers of the evening to at once appreciate the great superiority from every point of view of the newer apparatus.

DR. CURTIS said that the inferior meatus operation could not be compared to the canine fossa operation as the scope of the operation was different. As a preliminary operation it was always to be advised. Even if septa or dentigerous cysts were discovered, the canine fossa operation could be performed afterwards, with drainage already established into the nose. The general surgeons who do the canine fossa operation exclusively are possibly not aware how many of their antrum cases find their way after reinfection to the rhinologists. The great trouble in the canine fossa operation is the premature healing of the mouth orifice and not the difficulty of making it heal. The moment the mouth orifice heals with no nasal drainage, that moment the antrum is liable to become reinfected. As regards the criticism of showing a large armamentarium for a slight operation, he thought when students and general practitioners were present, to be instructed by a discussion of this sort, that it was a very wise thing to show the canulas, forceps and other instrument required in the performance of the operation under debate.

In regard to the suggestion that better drainage was secured in the mouth operation, he would answer that drainage with oxygenation of the cavity by means of a large nasal fenestration was much superior in the results obtained.

As for the inferior meatus operation, he performed this with a mallet and curved gouge, which were all the instruments which were really necessary, except in trimming the edges afterward; but remembered being called into the country, and, relying upon the statement that everything that was necessary for a canine fossa operation would be provided, he had called for a retractor, and found that there was none, as it was not thought that it would be needed. One of the surgeons who had spoken had said that hemorrhage was something which need not be considered at all in the antral operation. He had had some experience with hemorrhages of the antrum cavity. There are some membranes which bleed like stuck pigs. He had had cases with tremendous hemorrhages from the nose and antrum and had been glad to get his finger in and control them.

In regard to the rough edges of the nasal wound which had been referred to, he had found it very easy with suitable spoons and sickle knives, even if the dental burr drill was not employed, to go around the orifice and make the edges of the wound so smooth that the most delicate gauze would not catch on any portion of it. The two methods of operation have nothing to do with each other, and should not be compared, for they do not aim at the same effect. They are intended for entirely different conditions. To sum up, he would simply remind the section that the inferior meatus operation should always precede the canine fossa route, for in a great majority of cases it had proved all sufficient.

DR. MYLES said that it was very difficult to take a series of one hundred cases and discuss each case relatively, and he thought that this should be considered. The cases must be met as we find them and not as we would like to have them. For year he had performed the operation through the canine fossa, and noticed some things which were very peculiar. He had tried curetting, and had then omitted it; and it soon occurred to him that what had been curetted was not a true granulation tissue, but was an oedematous mucosa; and when he relieved the cavity by freer ventilation and drainage, the mucosa returned to a normal condition. He had noticed that when the inferior meatal route was adopted, the cases did well without curettage. Then Luc's operation was introduced, which was an excellent operation in its way, but required too much surgery. He had a serious objection to curetting a mucosa, which only needs an opportunity to get well of itself. Dr. Myles said that he had never seen a dentist remove all the buccal mucosa from the alveolar process on account of a caries, even extensive caries beneath the gum, gives but little trouble so long as there is free discharge. Practically the same condition exists in the antrum, which creates a focus of infection, which cannot get out, which in turn forms a degenerative process, producing a septic condition. When one secures a large opening, nature usually relieves the condition.

In regard to the partitions in the antrum, he saw no necessity for removing them, for the mucosa will return to its normal state on these as well as on the other walls, provided one secures free drainage and ventilation. He packs the cavity to express out the oedematous material. He had seen very little hemorrhage from within the cavity. The hemorrhage is generally in proportion to the curettage and from the turbinal wound, but in order to prevent bleeding, he uses a moderate tamponage of the cavity for 48 hours, and then lets it alone.

As to the instruments required for the operations, some would be required for one case, and some for others, but take a dozen cases and one would probably find need for all that he had presented to-night. Some cases require small instruments, and others where the nostril is wide admit larger ones. One cannot provide the nostril he may desire, but must have instruments fitted to the different requirements.

It was unfortunate that the time was so limited for the discussion of so important a subject, but he thought that when one was considering a large number of cases about 10 per cent would perhaps require the Caldwell-Luc operation through the canine fossa—closing the wound in the mouth, and drainage through the nose, and that for the other 90 per cent the intra-nasal route would be the method of choice.

DR. ABRAHAM said that in a twelve-minute paper it was absolutely impossible to cover all the points of this subject, and that in speaking of the radical operation he had undertaken to describe the simplest one. He was perfectly familiar with the modern radical operation, as he has operated on several cases by this method. He agreed with Dr. Bodine that Dr. Lloyd had not confined his remarks to empyaema, the subject under discussion, but had spoken of tumors, etc., in the antrum, which the papers of the evening had not dealt with. He fully agreed with all that Dr. Bodine had said excepting on two points. The Doctor had said that the curetting of an antrum is not advisable. Dr. Abraham said that the case he had just shown met this point, and also some of the points which Dr. Douglass had made. This case had presented a bulging naso-antral wall so that it was impossible to see beyond it. The cause of the chronic pathological condition was a large polypus and a mass of smaller ones. The polyps were removed and the antrum was curetted gently, and the patient was discharged cured after three or four weeks of treatment through the inferior meatal route. In regard to the number of instruments, he would like to know if any surgeon could operate through the fossa without the use of a knife, artery and dressing forceps, mallet, chisel and retractors. He had presented practically only two instruments, and the scissors making three. Of course, such things as applicators and other accessories were required in the treatment. Some of the gentlemen had spoken of the Caldwell-Luc operation for simple empyaema of the antrum. If we are dealing simply with empyaema of the antrum, why is it necessary to do such a radical operation as the re-

moval of the external wall, plus the intra-nasal operation? Why perform a major operation when the condition can be relieved by the simpler minor operation? Nearly every antrum upon which he had operated he had curetted through the nose; he had also treated and cured caries; he seldom encountered necrosis. He had seen only three cases of caries and they were of dental origin, and in these the teeth were extracted and the case treated accordingly. As for septa in the antra, teeth in the antra, etc., these can all be detected through the nasal route. He differed with those who remove the anterior end of the turbinate, and himself removes only the lower border. It was remarkable how much can be seen when this is done. In regard to sloughing and rough edges, they do occur, but not necessarily if the proper technique is observed. When curetting the antrum he does it very, very lightly, and does not remove the mucous membrane—only the granulations, caries, etc.

NEW INSTRUMENTS.

A Blunt and a Cutting Laryngeal Dilator. By J. W. GLEITSMANN, M.D. (*Published in full in this issue of THE LARYNGOSCOPE, page 379.*)

DISCUSSION.

DR. DELAVAN spoke in terms of high commendation of the cutting dilator presented by Dr. Gleitsmann. He called attention to its great superiority over other dilators, of which, next to Dr. Gleitsmann's, McNeil Whistler's had been the best. Dr. Gleitsmann's instrument was easily manipulated and accurate and its action was under perfect control. The speaker had recently employed it, in company with Dr. John Rogers, in a case of stenosis of the larynx in a young woman in which the obstruction was caused by a firm mass of cicatricial tissue which united the vocal band throughout their anterior half, and extended for three-quarters of an inch below the glottis. With Dr. Gleitsmann's instrument, division of this mass had been easily accomplished.

CHICAGO LARYNGOLOGICAL AND OTOLOGICAL SOCIETY.

Regular Meeting, March 19, 1907.

J. HOLINGER, M. D., President.

PRESENTATION OF CASES.

Case of Exfoliation of Os Tympanicum. By F. G. STUBBS, M.D.

This young man, James R., aged twenty, has an hereditary crumpling of the auricle with a supernumerary tragus. The auditory canal has always been extremely narrow and accounts for the course of the disease. While the hearing in that ear had never been acute, yet he had never had any inflammation previous to this attack. About the middle of October, on returning from work, he was taken with a sharp pain in this ear, which continued all night and kept him from going to work the following day. That evening the pain eased up and he soon noticed what he thought was a moisture from an increased amount of ear wax. The following morning there began to appear a swelling behind the ear and some paralysis of the same side of his face. The next morning, fourth day, he came to my office, when I saw him for the first time. I found complete facial paralysis, a boggy swelling behind and somewhat below the ear, the canal completely closed, and, from it I could see a slight discharge of muco-pus exuding. The same afternoon I operated, making the usual incision as for a simple mastoid, but prolonging the incision farther down than usual. I found pus outside the tip, and on enlarging the incision soon got into an abscess cavity below and anterior to the tip. In this cavity I found the facial nerve and so I cautiously mopped it out in order to avoid wounding the nerve. Believing I had a Bezold's abscess to deal with, I proceeded to open the cells. I found them normal; but, at the same time, I found the os tympanum free from all attachments and removed it entire. The inner third of the soft parts of the canal, together with the middle ear cavity, was necrotic and had to be curetted, so that I had a condition somewhat similar to part of a radical mastoid operation, except that the attic wall and antrum were not disturbed. In two months the wounds were healed, and I do not think the external canal is any narrower than it was before the operation. The secretion has now ceased and hearing is about half of normal.

I did nothing for the facial paralysis, as it is shown by experience that where the integrity of the nerve is not injured the usual course is to complete restitution of function. As you see, the results are perfect, but it is only in the last few weeks that it is so.

I am unable to find, as far as I have gone in the literature, a report of this exact condition of affairs. In young children, this part of the temporal bone is not uncommonly cast off as a sequestrum, for at that age it is not attached to the other parts of the temporal by bony union. In the adult, it is not rare in syphilitic necrosis, to find that all or part of the os tympanum is cast off as a sequestrum. But in this case it was entirely dissected loose by virtue of the fact that the pus was held back by the narrow canal and thus forced down through the suture attaching this part to the squamous and petrous portions. The abscess forming below this and the tip of the mastoid and thus early causing the facial paralysis.

It is well to bear in mind the formation of this portion of the temporal in its embryonal formation and to remember that this suture is frequently only loosely formed of connective tissue, that the blood-vessels pass through it and enter the cells of the mastoid and hence form an atrium for the infection in the mastoid to pass out and point below the tip of the mastoid.

A Case of Rhino-Scleroma. By F. G. STUBBS, M.D.

This patient, Mary G., aged twenty-one, is a native of Austrian Poland. She has been in this country four years. Previous to this time has never been sick, and first complained of this trouble some time after coming to New York, where she first lived. Then she was told that she had only some slight catarrhal affection. Her symptom was an increased nasal secretion. For the space of a few months before coming to Chicago, five months ago, she began to have a slight cough and a peculiar huskiness to the voice.

This increased so that the breathing was as loud as that of a patient with croup, and could be heard in the next room.

She was referred to me six weeks or so ago by Dr. Hedger, and I found the following conditions: The lower turbinates on both sides were enlarged in their posterior thirds, larger on the right, firm to touch and of a grayish color. The lower edges of the choanæ were thickened, as was the neighboring edges of the septum. The pharynx showed no invasion of the process. On looking into the larynx, I found the cords unaffected, but the rima glottidis gave

the appearance of looking into a cavern. This was due to a sub-glottic swelling covered with mucus and blackened with Chicago soot. It was difficult to make out any chink at all through which air could pass. I succeeded in passing a No. 2 Schroetter dilator and continued this every other day, at first, till now I have been passing it only once a week. This has relieved her of all dyspnoea and reduced the cough. During the time she has been under my observation there has been a perceptible increase in the size of the swellings already present and an additional one on the base of the tongue.

I excised a piece of tissue from the lower turbinate and at the same time had cultures taken from the secretion which was free in the nasal passages. The latter showed almost pure cultures of the Rhinoscleroma bacillus and it was found in the tissue as well. The tissue also showed the typical pathological conditions, including the "Mikulicz cells."

In view of the hitherto unsatisfactory results of treatment I had not taken up any definite procedure aside from keeping the sub-glottic space open for easy breathing. Recently there have been a few cases reported in Europe and New York in which it seems evident that the X-ray has acted as a specific, so to speak. Of the two cases reported from New York, I saw one last spring with Dr. Ballin at the Mt. Sinai Hospital. This case was affected only in the nose and externally, but is reported as cured. It is to be hoped that a remedy has been found, for the condition was almost hopeless up to now. Although the disease is not fatal unless it attacks the lower trachea and bronchial tubes, yet it is a serious form of rhinitis and more to be shunned than atrophic rhinitis.

The importance of presenting this case to you tonight lies alone not in its rarity and hence in being an "interesting case," but in drawing our attention to the fact that while there are not a score of these cases reported in this country there is no reason why they will not become more numerous as our unrestricted immigration allows more of these cases to come amongst us. The disease is on the increase in Europe, and on account of its infectious nature governmental measures have been talked of in eastern Prussia to deal with it as with leprosy.

Dr. Reichman has offered to use the X-rays on this case, and I will present it again so you can see whatever progress is being made. While it is not difficult to apply the rays to the nose, it may be more difficult to reach the interior of the larynx. We hope to

obtain therapeutic results by applying them over the larynx. If it does not prove active, then it is a question whether by the aid of tubes the rays can be applied through the mouth, or a laryngo-fissure may have to be done and the larynx kept open while the treatment is being carried on.

DISCUSSION.

DR. ELMER L. KENYON.—One important matter with reference to rhinoscleroma is the making of an early diagnosis. I doubt whether rhinoscleroma has ever been seen and diagnosed so early that the disease could be handled at the beginning. This is unfortunate, because the condition is a serious one. When it attacks the larynx, it must be considered as approaching carcinoma in seriousness. Dr. Stubbs' case is a late one, but there are appearances in the nose which possibly represent conditions which might be found at the beginning of the disease. I refer to the hypertrophy at the middle portion of the right lower turbinate. Laryngologists should be on the alert to become familiar with conditions which make possible an early diagnosis.

Concerning treatment, surgery, excepting in the direction of alleviation, has invariably failed. The tumor removed from the nose in the case I studied returned exceedingly rapidly, within a few weeks.

There is reason to believe that native Americans are susceptible to the disease, although it is fair to suppose that the infection has not been present in this country except as brought in. Some years ago a Buffalo physician reported a case occurring in a native American who had never been out of this country. However, in that instance, a microscopic diagnosis was not reported.

The patient I saw had drifted from physician to physician for five or six years without receiving a suggestion of a correct diagnosis. Recently I saw a case of carcinoma of the larynx which had gone through much the same experience. It seems to me desirable that when the opportunity arises something should be said in the way of impressing upon the general practitioners the importance of having an expert examination made where diagnosis is doubtful.

A Case of Idiopathic Abscess of the Nasal Septum. By J. HOLLINGER, M.D.

This little boy of five years traveled with his father across the country on a very cold winter day about a year ago. On returning

home, his father noticed a red swelling in both nostrils. Nasal breathing was impossible. When I saw him five weeks later the mucous membrane of the septum filled both nostrils. The condition has changed comparatively little since then. The swelling is reduced. There was complete absence of the cartilaginous septum from the beginning. Pus was discharged from the swelling in both nostrils, and from the right upper incisor, on pressure of the gums. The tooth was extracted. The mucous membrane of the septum was treated as in acute anterior rhinitis, but improvement was very slow. The bone below the apertura pyramidalis became thickened and small spiculae of bone were repeatedly exfoliated. I made an incision into the swelling, and at every treatment I evacuated a few drops of pus. During the last two weeks, that is, over a year after the beginning of the disease, the permanent incisor tooth erupted in an abnormal position from the anterior surface of the gum. The abscess is drying out very slowly. The triangular cartilages have disappeared.

A Case of Chronic Affection of the Eustachian Tube, 3 Schwartz,
1 Radical Operation, Pericartilaginitis, Cured Facial Paralysis.
By J. HOLINGER, M.D.

Mr. N. was seen the first time in July, 1903, complaining of nearly the same symptoms as he does now, namely, headache, dizziness, running of the right ear, noise. The Eustachian catheter relieved all symptoms and the functional tests showed that there was no other change in the middle ear. A course of treatment with catheter improved the condition. He left the city. Soon all his ailments reappeared. I saw him again in the summer, 1905, when he had a large suppurating fistula behind his right ear, packed with iodoform gauze, and again he complained of dizziness and headache. He gave the following history: He was operated upon in the fall, 1905, in Chicago, and made a very slow recovery extending over three months. He was operated upon a second time about two months before I saw him in 1905. A large scar in the neck behind the sterno-cleido mastoid muscle dated from an abscess operated upon in 1903. He said that the depth of the wound was cauterized at regular intervals by his doctor and still the fistula would not close. I catheterized the tube every second day and the fistula closed after two weeks. He again left the city and reappeared at my office last June. He was previously operated upon for the third time in March, 1906. He complained again of head-

ache and dizziness. A course of treatment with the catheter relieved him temporarily, but he wanted to be cured permanently. I therefore proposed radical operation, which was performed in Alexian Brothers' Hospital. A large keloid in the old scar was removed. The bone was very hard and showed no cells. A fistulous tract began one centimeter below the outer plate above the antrum, and led to a whitish fibroid mass, round in shape and one and a half centimeters in diameter, which was not well outlined from the surroundings except from the tympanic cavity. This mass made me suspicious of carcinoma and was therefore completely removed, regardless of consequences. The posterior semi-circular canal was opened and the dura exposed to a large extent. The whole posterior bony wall of the meatus was removed, together with the incus. A "Y" shaped incision in the concha was made and suturing and packing through the wound in the concha was done in the usual manner. The specimen was lost, notwithstanding the extreme care that was recommended for its preservation.

The next day there was complete facial paralysis on that side.

He made a very slow recovery. The first dressing was changed five days after operation. Ten days after operation, swelling and pain in the auricle appeared. The dressings were changed every day. The auricle was exposed to sunlight for hours. A perichondritis ran its full course and left the auricle with a horizontal fold above the meatus. The epidermisation of the wound was very slow and took over eight months, five times as long as usual. The drum membrane regenerated to its full extent, and with it the old complaints of headache and dizziness reappeared.

The lack of any tendency of healing is shown in another fact. The wound behind the ear had healed by primary union, when several months after operation a suppuration started up from a part of the wound that was dry and epidermized for several weeks. It destroyed all support of the scar and left, after a long course, a deeply retracted funnel-shaped scar with a very narrow persistent opening, behind the ear, which I am going to leave untouched, as the slightest touch with a probe wound with cotton is liable to start a suppuration lasting for months.

The ear is dry at present. Now and then a small drop of pus forms in the outer excavation of the canal from under the outer scar. The paralysis of the facial nerve has disappeared, he closes the eye and moves the angle of his mouth.

The functional tests show: Hearing distance for whisper, right ear, 0; left ear, more than 5 in. Rinné test, right ear, + t; left ear, — 10. Lowest sound heard, right ear, 38 d.v.; left ear, A'.

He comes three times a week for catheterisation.

The features of this case are: 1. Three Schwartze and one radical operation on account of symptoms due to occlusion of the Eustachian tube. 2. Complete paralysis of the facial nerve, cured. 3. Extremely poor tendency of healing of the soft parts and the bone. 4. Pericartilaginitis of the auricle cured with scar. 5. Persistence of the original symptoms, headache, dizziness, subjective noise, which are all relieved after catheterisation. The discharge has ceased.

This latest point involves theoretical questions: How can those symptoms be explained in view of absence of the incus? Suction on the stirrup?

DISCUSSION.

DR. J. C. BECK: I would like to ask Dr. Holinger why he called the first case one of idiopathic abscess. Supernumerary teeth and alveolar abscesses frequently burrow along the septum, thus causing the condition seen in this case. The appearance of sequestra and pus and the later eruption of the tooth show that such a condition may have existed. I have a similar case under observation. Leaving the cavity alone pus shows an extension along the floor of the nose toward the septum, and on opening the cavity pus exudes and the boggy and swelling in the nose disappear. A radiograph may show more than one tooth, and I would suggest that Dr. Holinger have one made. It may suggest a cause for the condition.

In regard to the second case, it is nice to see so many cases that get well without operative interference, but I think you will find that the continuity of the facial nerve was not destroyed entirely. Inflammatory conditions will produce facial nerve paralysis; and when this subsides the nerve regains its function.

With regard to the use of X-ray tubes in the mouth, that is impossible, because we cannot get a bulb that is small enough to throw a direct ray on the larynx, and the ray cannot be deflected; but it can be passed through the neck.

DR. HOLINGER (closing the discussion): The tooth did not appear until about two weeks ago. Before that it looked like a callus. I think the abnormality of the tooth is rather effect than cause of the suppuration, because a thickening of the bone began to develop

only eight months after the tooth was pulled, and even now the abnormal tooth is far ahead in development of all other teeth, owing to the early extraction of the milk tooth.

Case of Laryngeal Neoplasm. By OTTO J. STEIN, M.D.

The patient is a man forty-eight years old, a coal dealer, who has always been healthy. No history of venereal disease. His father is still living; his mother died at the age of sixty, of some heart affection. The family and personal history is absolutely negative. The present trouble was first noticed as a hoarseness less than four months ago. It came on gradually, but finally got so bad that he consulted a physician, who treated him expectantly. He has lost about ten pounds in weight in six months. His appetite is good; temperature is normal. Examination of the chest disclosed an emphysema of no great moment. The sputum was negative. The man had a severe pharyngitis when first seen, but that has disappeared.

On examining the larynx, nothing is seen above the cords, but below the right cord there is visible a tumor that is attached to the lateral wall of the larynx. The cord is quite red, thickened, and almost immovable. At the edges it is slightly ragged. The left cord is normal. There is fair compensation and approximation is very good. The tumor has a yellowish-pink color, suggesting a papilloma or granulation tissue. On palpation there can be felt slight enlargement of the glands of the neck, but palpation of the larynx shows no marked thickening on the right side. Evidently the mass takes its origin deep in the tissues of the larynx. Microscopic examination of the tumor mass showed granulation tissue. The history and laryngeal picture indicate a malignancy. If this is the correct diagnosis, it is imperative to operate radically and without loss of time, in order to secure the most favorable prognosis.

DISCUSSION.

DR. E. FLETCHER INGALS: The history of this case is so typical of malignancy that it seems that there is no chance of its being anything else. There are only three things that it might be—syphilis, tuberculosis, or carcinoma. From the history, I would say carcinoma. The cases of subglottic tumors that I have seen do not show up very much, even though they involve considerable tissue, and prevent the movement of the cord. I have not yet seen any that could be successfully removed in any other way than by a laryngec-

tomy, for the reason that although the growth may have appeared small on laryngoscopy, it was shown at the operation to have passed beyond the median line a considerable distance.

Embryonic Preparations. By G. W. BOOT, M.D.

DR. G. W. BOOT gave a demonstration of preparations of sections of the human embryo, showing the development of the nose, antrum, sinuses, and portions of the middle ear.

Demonstration of Probable Angioma Removed from External Auditory Meatus. By GEO. E. SHAMBAUGH, M.D.

You will remember that about a year ago I exhibited before this society a patient who had vicarious menstruation from the ear, the bleeding taking place from a swelling on the upper anterior wall near the external part of the meatus. The growth filled about two-thirds of the meatus, and terminated in a nipple-like projection. A crystal of chromic acid checked the bleeding, but the swelling was the source of a great deal of annoyance. The tumor was removed six months ago, and there has been no evidence of recurrence. At the menstrual period, the ear previous to the removal would become red and annoy the patient very much for a week. The tumor bled freely at its removal. It shows a very greatly thickened skin; the deeper structures are very vascular. The tissue resembles the erectile tissues of the turbinated bodies. The tumor is evidently a form of angioma.

**JOINT MEETING OF THE CHICAGO LARYNGOLOGICAL AND
OTOLÓGICAL SOCIETY AND CHICAGO MEDICAL SOCIETY.**

Joint Meeting, March 20, 1907.

DR. J. HOLINGER, M. D., President of the Chicago Laryngological and Otológical Society, in the chair.

Papers were read as follows:

Relation between Diseases of the Faucial Tonsil and Rheumatism

By E. FLETCHER INGALS, M.D. (*To be published in full in a subsequent issue of THE LARYNGOSCOPE.*)

The Relation between Diseases of the Faucial Tonsils and Enlargement of the Glands of the Neck. By JAMES T. CAMPBELL, M.D.

Discussion of the Occurrence of Tubercular Disease of the Tonsils

By CHARLES M. ROBERTSON, M.D. (*To be published in full in a subsequent issue of THE LARYNGOSCOPE.*)

JOINT DISCUSSION.

DR. JOSEPH A. CAPPS—In the absence of Dr. Herrick, who was to have opened the discussion on Dr. Campbell's paper, I was asked to take part in the discussion on the relation of inflammation of the throat to inflammation of the lymphatic glands. Dr. Campbell has already covered the association of inflammation of the throat and glands so thoroughly that I will only speak of one group of cases, to which he did not pay any special attention, since his paper was so broad in scope. I refer to the type of cases with acute cervical adenitis that occurs especially in children, and with a simple sore throat. When I say simple sore throat, I say it purposely, because its etiology is not definitely settled. It is a type of sore throat, however, we would ordinarily call a grip sore throat, and this combination of sore throat and adenitis is especially interesting, and important just now for two reasons: First, the combination has in the last year been more prevalent than usual; and, second, some new light has been thrown upon the etiology of these infections. Perhaps, etiologically, this is not a distinct group, but clinically it is, and I think it would be well to point out some of the characteristics

of this class of cases. The clinical picture I refer to is this: A child has sore throat, high temperature, and a correspondingly rapid pulse. On examination, the throat is seen to be neither ulcerated, nor is there any follicular tonsillitis, such as we might have anticipated from the symptoms, but simply a red, congested throat. The soft palate, the tonsils, pharynx, and naso-pharynx, take part in this redness equally. The temperature remains high for several days. The infection is more severe than one would expect from the first examination; then gradually the temperature subsides. Perhaps there has been a slight glandular swelling, but not pronounced, when an exacerbation of the symptoms comes on. The fever rises usually to 104 to 105 degrees, the pulse is rapid again, the child seems quite as ill or more so than at the first visit, and there is noticeable a very decided swelling of the cervical glands, particularly near the angle of the jaw, involving the deep cervical glands. This enlargement of the glands, at first discrete, is very apt to become diffuse, and is very rapid in its progress until the lump may become the size of a hen's egg or the size of the fist, and usually it is quite hard and tender, rather irregular in outline, and, as I said before, it is apt to become diffuse, so that we cannot make out definitely the individual glands. This tumor mass, made up of inflamed glands, may remain without much change; the temperature continuing for a week or two weeks, possibly longer, when it follows one of two courses: It either begins to subside, and when once it begins to subside the improvement is rapid, or else the case goes on to supuration. A red spot appears at some point, and either ruptures spontaneously or is opened, and a small quantity of pus is evacuated. Usually the whole group of glands does not suppurate, only a portion of them. I presume that this clinical picture has been more common in the last year or two, not because it is anything new, but because all infections of the throat have been so prevalent this last year.

In looking up my records, I find that in the last two years I have seen five cases which would fairly come within this group. Of that number, in four, cultures were taken from the throat, and in all four, influenza bacilli were found in considerable number; but the smear did not show a pure infection by any means. There were present also streptococci or staphylococci. Two cases progressed to supuration, and the pus from them both showed streptococci in large numbers.

The etiology, as I said before, is not clear. The fact that gripe organisms were so often found in this group led me to make some inquiries among physicians with regard to these cases, and I learn that in many similar cases seen by other physicians, influenzal infection forms a basis of the whole picture, and it recalls the so-called glandular fever which Pfeiffer described. Possibly it is similar to the enlargement of the glands he described, and which he attributed to the influenza bacillus; but whether he found the influenza bacilli in the glands or not, I do not know. The fact that in the two suppurated cases streptococci were found would suggest that the glandular swellings which break down are probably due to mixed infection. We might assume that we have gripe infection in a large proportion of these cases; that pyogenic cocci are present in some, possibly in all, and that these cocci are responsible for breaking-down of the glands. I think it quite probable that the large gland tumors which do not suppurate are also due to the pus organisms, for we do not see in ordinary cases of influenza any marked predisposition to glandular enlargement.

The diagnosis of these cases is not at all difficult. An important thing in my experience is the great size of the enlargement, the height of the fever, and the constitutional symptoms. There is nearly always a leucocytosis of 15,000 to 20,000, and the appearance is quite alarming unless one has seen the same picture before.

These cases may be confounded with acute tuberculosis. In fact, Dr. Eisendrath, in a recent article, described two cases of a similar type clinically upon which he operated, and which he considered from the nature of the cheesy pus were tuberculous. It is certainly a very unusual form of tuberculosis. But the cases I have described in this general type can usually be readily distinguished from tuberculosis by the sudden appearance of glandular swelling, and even more by the rapid disappearance of the swelling. In some of these cases there may be a lump left in the neck for several months, but in the course of five or six or eight weeks, as a rule, nothing remains to tell the story. We could hardly conceive of a tuberculosis disappearing so quickly and so completely.

I think it would be profitable if cultures were more generally made in these cases, in order that an etiological classification might be made.

DR. DANIEL N. EISENDRATH—This is a subject that interests the general surgeon almost as much as it does the specialist in nose and throat work, and it is one I have been particularly interested in for

a number of years, and have kept accounts of the cases I have seen. The cases to which Dr. Capps referred are especially interesting. This winter they have not been as prevalent—at least, I have not seen as many as I did last winter. These cases were what Dr. Capps has called acute enlargement of the lymph nodes of the neck, and probably correspond to some extent with those described by Pfeiffer in 1899 as glandular fever. In the cases which I saw the enlargement of the lymph nodes was out of proportion to the height of the temperature. Very frequently I was called to see these cases in consultation. A child, for instance, would have a temperature of 104 or 105 degrees, with a relatively small number of lymph nodes enlarged, not larger perhaps than the average sized marble. During the present winter, these cases have assumed a little different type in that not only have they affected the lymph nodes of the neck, following primary sore throat, but they have affected other lymph nodes, as those of the axilla, the groin, apparently taking part in the process of a general infection, so that in some cases it was thought there was an acute lymphatic leukemia until the blood was examined.

The case which Dr. Capps referred to is one I reported last winter. This was especially interesting. The patient was a boy, 14 years of age, attending high school, who had been treated by his physician for grip and enlargement of the glands of the neck. Following this treatment, his temperature apparently became normal. I saw him three or four weeks after the enlargement had begun. On account of a swelling existing in the sternocleido-mastoid muscle, and finding distinct fluctuation, I excised what I considered to be a typical tuberculous broken-down gland that continued to suppurate for about two weeks longer, and I did a radical operation, extirpating about twenty typical tuberculous glands in all stages, from the little tubercle to the large broken-down cheesy gland. Undoubtedly this was a case of mixed infection, where the Pfeiffer bacillus infection was, in all probability, the primary cause of the trouble, with secondary infection with tuberculosis. It is of especial interest because these cases are apt to be overlooked and are considered to be ordinary glandular fever.

A number of very interesting points have been brought out. Unfortunately, I did not hear the paper of Dr. Ingals; I simply heard Dr. Robertson's reference to it. Dr. Robertson, in quoting Dr. Ingals, said there were no cases of primary tuberculosis of the tonsil, if I understood him correctly. I have had occasion to look up the

literature quite thoroughly, and the first question that arises is this: What can be considered primary tuberculosis of the tonsil? The most rigid test of primary tuberculosis of the tonsil would be that at autopsy you can find no other focus of tuberculosis in the body. But that is usually impossible, and we must depend upon the clinical findings, as in tuberculosis of the lungs or intestines, and from our observation of the patient.

There have been reported eleven undoubted cases of primary tuberculosis of the tonsil, the majority of them having been verified by autopsies and of finding primary tuberculosis of the tonsil, in which there were no other tubercle bacilli found in the body. The primary focus being in the tonsil, with secondary involvement of the lymph nodes of the neck.

Dr. Robertson referred to some researches that have been made by Luder, who found in 32 cases only 5 of tuberculosis in extirpated tonsils. It is a hard problem to decide whether there is in these cases primary tuberculosis of the tonsil or not. In about sixty cases of operations for tuberculosis of the lymph nodes of the neck, I have made it a rule to have associated with myself a laryngologist and rhinologist for the purpose of extirpating the tonsils. It is a fact not known generally by the average surgeon or general practitioner that tubercular lymph nodes of the neck will cease to develop in the majority of cases if we remove the primary focus, which, so far as we can tell, is in the tonsil. I have seen that verified clinically in two cases. One patient was a boy, ten years of age, upon whom I operated for the removal of tubercular glands of the neck. I removed a large number of them, and at the end of six months he came back with as large a crop as before. I took out a second lot of these tubercular glands or nodes, and had a specialist remove the tonsils and adenoids. Since that time there has been absolutely no recurrence. I had the same experience in a second case.

I wish to emphasize the point that in every case, where a surgeon operates upon tubercular glands of the neck, he ought to have the tonsils and adenoids removed, because the percentage of tubercular tonsils and adenoids, as researches show, varies from eight to ten or twelve per cent., so that we cannot afford to take any chances in leaving them.

As to the relation between appendicitis and tonsillitis, scarcely a winter has passed during the last two or three years that surgeons have not seen tonsillitis in children followed by typical attacks of ap-

pendicitis, so that clinically the association of the two diseases is quite well established.

DR. ROBERT H. BABCOCK—I have not heard a discussion in this hall for a long time which I regard of so much importance to the general practitioner as the one to which we have listened this evening. Perhaps in this connection, I might cite a remark made by the late Dr. Christopher in his last illness to the effect that, in thinking over his work among children, he was impressed by the fact that in nearly every instance of disease in children, of whatever nature, the portal of infection had been the throat, and that in a very large percentage of cases the portal of entrance had been the tonsil. This is a matter which I feel the general practitioner is not always sufficiently alive to; certainly, the cases of adults that come to me, as well as of children, bear out the importance of the condition of the tonsils. A large majority of the cases I see are instances with some form of heart disease, perhaps valvular disease, and nearly all the cases which I have investigated, since my attention was drawn to the subject a good many years ago by the researches of Fritz Meyer, have shown either chronically diseased tonsils, or a history of previous sore throat, using it in a general sense, and many times a tonsillitis.

I do not know whether Dr. Ingals referred to the work done by Fritz Meyer in the effort to determine the bacteria responsible for acute articular rheumatism, or not. The question is still *sub judice*; but I believe the trend of investigation and thought is to the effect that we must abandon our old notion that acute articular rheumatism is a blood disease in the sense of its being due to some chemical irritant; that it is, in fact, a specific disease. There have been a great many observations made which go far to prove, although they are not accepted by all, that the micro-organism responsible for attacks of acute articular rheumatism of the typical or classical type is a diplococcus allied to the streptococcus, and which has been styled the diplococcus rheumaticus.

We must recognize various kinds of articular rheumatism, some of which seem to be of a specific type, and others of which are due to streptococcus infection apparently, but are not specific.

With reference to the importance played by follicular tonsillitis in the production of acute endocarditis, I would like to cite the instance of a young man in this city who, in April, two years ago, developed an acute tonsillitis which he thought but little of, which was treated by his physician, and subsided to all appearances in a

few days. He did not, however, regain his health fully, and in the latter part of June developed symptoms which, at first, were obscure and thought to be those of typhoid fever. The disease proved to be a streptococcus infection with malignant endocarditis, pure streptococci being obtained from the blood. The disease progressed in spite of everything until he died in the following December, and the autopsy substantiated the diagnosis which had been made during life. In this case it was clear as daylight that infection started in the tonsil; that it was apparently a trifling tonsillitis, and yet it resulted in this man's death six months later.

With reference to tuberculosis of the tonsil, I would only like to say that statistics are at variance as to the frequency of primary, as well as secondary, tuberculosis of the tonsil; but that tuberculosis of the tonsil does take place, there can be no doubt, and that diseased tonsils in childhood furnish a culture medium for the development of such bacilli as may be inhaled, is beyond all cavil, and therefore the tonsils may furnish a portal of infection which may ultimately result in pulmonary tuberculosis in adult age. Therefore, I am radical in my opinion and advice to parents, to have the tonsils of their children removed.

DR. FRANK S. CHURCHILL.—This is a subject which interests the pediatrician fully as much as it does the laryngologist. I would like to emphasize especially what Dr. Babcock has just said with reference to the importance of the removal of enlarged tonsils and adenoids in children. A child with enlarged tonsils which are always in a diseased condition is exposed constantly to repeated infections, not only minor infections, such as those produced by the streptococcus and influenza bacillus, but the more serious infections, such as those produced by the Klebs-Loeffler bacillus, and scarlatinal infections. Such children are more apt to pick up these infections than if they are minus this disease of the tonsils. I always advocate and advise parents of patients to have these adenoids and enlarged tonsils removed.

There is one point to which I am afraid the laryngologists do not attach enough importance, for the simple reason that they do not see their patients afterwards as often as do the pediatricians. I am very much opposed to having the tonsils and adenoids of children removed in the fall and winter months of the year. I would have them removed, if possible, in the late spring or summer, on account of the climatic conditions under which we live, for I have seen repeatedly children from whom these gentlemen have removed

adenoids and tonsils in the fall of the year, having persistent "colds" throughout the following winter, having attacks of infections of an unknown and indefinite nature. So I think it is quite important that the tonsils should be removed during the warm season of the year.

The paper in which I am more particularly interested is the first, that of Dr. Ingals, on the relationship of tonsillitis to rheumatism. It seems to me Dr. Ingals takes too limited a view of the term "rheumatism." It is among children especially that we have the best opportunity for studying the manifestations of this disease, for at this period of life it is most varied in its forms. In children, we do not see an arthritis as the most common and frequent manifestation of rheumatism. We see, rather, endocarditis. Cheadle was one of the first, if not the first, to point out the broader conception of the term rheumatism. "Arthritis is at its minimum, endocarditis is at its maximum." Other manifestations of it are, in addition to tonsillitis and endocarditis, the subcutaneous enlargements which Cheadle and other Englishmen speak of frequently—erythema and pleurisy, and some English writers speak even of certain attacks of appendicitis as a manifestation of rheumatism, which is interesting, *apropos* of Dr. Eisendrath's remarks about the association of tonsillitis and appendicitis. Chorea is another manifestation of rheumatism very often, if not in all cases. These are not *complications*, but are *manifestations* of rheumatism, pure and simple, not always, but in a great many cases. Taking this broad conception of the term, it is obvious that if we go carefully into the histories of our cases, both before we see them and follow them up later on, we shall find more frequently in our cases of tonsillitis a history of antecedent rheumatism; that is, if we inquire whether or not the child has had any one or all of those different things—chorea, tonsillitis, endocarditis, erythema, pleurisy, etc. In children we must be prepared to see these wider manifestations of the disease. Furthermore, these manifestations often cover long periods of time, stretching not only into weeks and months, but may be into years. They are apt to occur in children with a rheumatic family history; they occur in children who have attack of tonsillitis at one time; at another time an attack of endocarditis, and still another time an attack of erythema, or the development of subcutaneous nodules, etc.

Dr. Babcock spoke on the bacteriology and has quoted the work of Fritz Meyer, which is extremely interesting. After all, until

we find out more about the bacteriology of the subject, our views will be more or less theoretical, but as far as they go, of one thing there can be no doubt, and that is the general trend of opinion is to regard rheumatism as an infectious disease; and the researches of Fritz Meyer go to confirm that view. The cause is perhaps the diplococcus of which Meyer has spoken, and which he has found on the tonsils of rheumatic individuals when he has failed to find it in the blood or in other parts of the body. He has also found it in the subcutaneous fibrous nodules, of which apparently the English see more than we do in America, bearing out the theory that these are also of an infectious nature and are a manifestation of rheumatism.

Dr. Campbell said that breast-fed infants are more immune to infectious diseases than are other individuals, if I understood him correctly. That is true, but whether or not it is due to the absence of the tonsil, as he also stated, I am rather skeptical. The immunity does not apply to bottle-fed babies, equally without tonsils. In this connection, it is interesting to refer to the work of Amberg, of Baltimore, who has tested the opsonic index (to staphylococcus) of breast-fed babies and also of bottle-fed babies, and has found that, as a rule, the index of breast-fed babies runs higher than does the index of bottle-fed babies, showing, I presume, a greater resistance on the part of such babies to infectious diseases.

DR. ELMER L. KENYON.—It seems to me that the specially significant idea involved in the series of papers read tonight is the attempt to substitute facts for what has heretofore been largely speculation. The whole question is one which concerns the relationship of conditions in the upper air and food passages to remote infections. If one searches the literature, he will find a good deal of supposition concerning such a relationship, and he will find a real absence of proof. It seems fortunate now that we have entered upon a course which promises to result in the accumulation of facts. But the proof of this relationship is certainly difficult. If it were true that remote infection usually followed at once upon an acute infection of the throat, then the establishment of the association would be easier. As a matter of fact, I believe the rule is that remote infection has no immediate reference as to time with local inflammation. A number of cases have been cited here tonight in which such a relationship has seemed to be immediate. In the effort to accumulate the facts in connection with these cases, it is highly desirable that every instance of apparent certainty in

the immediate association of throat inflammation with remote infection should be put into print, in order that an accumulation of proof may go on. On the whole, however, as I see it, for actual proof we will have to depend on statistics. This is unfortunate, because statistics are hard to manage.

Speaking of Dr. Ingals' tonsillitis cases, they are impressive; yet one would not be holding his mind open to scientific frankness if he did not realize the serious possibility of error in these statistics. Both in the tonsillitis cases and in the control cases, the patients may have been, and indeed to a large extent were, subject to such diseases as tuberculosis of the lungs, pneumonia, bronchitis, syphilis, asthma, hay fever, other inflammations of the throat and nose beside tonsillitis, and to various digestive disturbances, any one of which might have served to produce an atrium for the entrance of the rheumatic infection, because any mucous membrane connected with the outer air is certainly capable of bearing infective germs. So there is a real possibility of error here, and these statistics cannot but be viewed in the light of such possibility. Much more evidence must be adduced in order to prove the relationship of acute tonsillitis to rheumatism.

Cases of adenoids, I think, would be peculiarly favorable for such statistical study. The reason is that a series of cases of adenoids (including also faucial tonsil enlargement) might be found in children in which practically no other disease had been present, or was present, affecting either the skin or mucous membranes. A control series of cases in which children practically free of diseases either of the skin or of the mucous surfaces connected with the outer air, could also be secured. Such cases would be favorable for statistical study in this connection, because less liable to error from other incidental diseases of the mucous membranes.

Realizing that the mucous membrane of the pharynx as well as the lymphatic tissue of the tonsils might constitute an important source of haematogenic infection from the throat, I set out to attempt to formulate a series of statistical cases. I took out of Dr. Ingals' large store 278 records of cases of pharyngitis and rhinitis; I included very carefully only those cases in which the tonsils were clearly stated to be normal. I excluded all cases in which the patient had had any disease whatsoever, excepting the early diseases of childhood; the only exception to this was that one or two cases of inflammation of the ear were included. Out of these 27 cases, there were seven instances of rheumatism of one form or another,

that is 26½%. While this small list of cases can mean nothing accurate of itself, yet it tends to confirm the possibility of error in Dr. Ingals' statistics, and to prove that rheumatic infection may enter through inflamed mucous membrane. It is possible that pharyngeal inflammation is nearly or even quite as important as tonsillar inflammation in its liability to be the source of haematogenic infection.

DR. WILLIM L. BALLENGER.—The trend of opinion is that the tonsils are a course of infection not only for tuberculosis, but for rheumatism and many other diseases, and, being a source of infection, the question naturally arises, What can be done to prevent the absorption of infective material? In other words, shall we be content with the partial removal of the tonsils, or a complete removal of them?

Dr. Robertson found in his tubercular cases lesions at the bottom of the crypts. He said, also, that he found the crypts very often extended to the tonsillar capsule, the outer wall. I have removed many hundreds of tonsils with the capsule intact; and I have examined every one of them with a probe, and I have found few instances in which the crypts did not extend to or very near to the capsule. It is rare, indeed, that a crypt does not extend to the capsule or the entire depth of the tonsil. If we want to remove the source of infection, the atrium of infection in these cases, we should therefore remove the tonsil to the depth of the crypts, and the easiest and most certain way to do it is to remove the tonsil with its capsule intact.

As to the advisability of operating in the fall or winter, or of waiting for late spring or summer, Dr. Churchill has said he found in many cases that the children had fever or were subject to colds for some months after operation when the operations were done in the fall and winter. The explanation of that may lie in the fact that the tonsils or adenoids were not completely removed. The atrium of infection, the crypts, still being left in the sinus tonsillaris. However, I am not sure that this is the true explanation. If the tonsil is completely removed, this source of danger may be reduced somewhat. Hence, in my opinion, the only operation that is justifiable is complete removal of the tonsil, not necessarily with its capsule intact, but so much of them as to include all the crypts, which practically reduces it to the point where we must remove the capsule. I admit that all the essential part of the tonsil can be removed, and still leave the capsule; a safer way, however, is to re-

move the capsule as well. I can conceive of no serious argument against it, and by so doing we are absolutely sure we have removed the tonsil with its crypts in its entirety. Hence, I would leave this suggestion with you, that we should thoroughly remove all the tonsil instead of partially removing it.

One of the great surgeons of America recently said: "The tonsil causes more sickness, suffering and death than the appendix." This being true, the technique of the tonsil operation is worthy of the most careful and painstaking study. The time must come, and is speedily coming, when the partial removal of the tonsil will be regarded, in most instances, as reprehensible practice.

DR. INGALS (closing the discussion on his part).—I feel more convinced of the fact than ever that our impressions are not of much value. A good deal that has been said this evening is possibly the result of impression. I admitted in the beginning that my impressions had been wrong, and I question whether some of the impressions of others may not be found faulty. I had become impressed with the idea that rheumatism and tonsillitis had either no relation or only a slight relation to each other; but an examination of my records showed that there was a good deal more relationship than I thought, and it is possible that some of the impressions that others have had quite firmly fixed will be found to be based on no better evidence than were my own. It has seemed to me that there is very much chance for error in the subject we have been discussing, and in the meaning of the term rheumatism. I do not think we are capable of saying what rheumatism is. I should suppose, however, that the gentlemen who treat children are more apt to be right than those of us who treat adults, in making an accurate diagnosis of rheumatism and in finding true rheumatic cases. It is possibly true that the various conditions that are called rheumatic do not depend upon a single infectious agent, or whatever its cause may be; whether it be a micro-organism or a chemical substance, and it appears likely that there is more than one agent or factor that causes the various affections that we call rheumatism.

I was quite surprised by the statement made by one gentleman that there was such a large number of primary cases of tuberculosis of the tonsils. It surely does not accord with my own observations; therefore, I was somewhat relieved when Dr. Eisendrath said there were only eleven such cases reported. I knew that I had never seen a case that I was sure was primary tuberculosis of the tonsils; but if there are only eleven cases that have been observed

anywhere, I do not wonder at my not having seen one. Years ago I thought that I had for treatment a patient with primary tuberculosis of the tonsil, but later I came to the conclusion that I had been mistaken in my diagnosis. The patient did not die of tuberculosis.

The suggestion that diseased tonsils ought to be removed is very pertinent, provided they are of any considerable size. I have felt that as long as a tonsil is not larger than an almond, and showed no active disease, and so long as it does not give the person any inconvenience by becoming inflamed from time to time, we are not justified in recommending its removal. But I do think, whenever a patient has a diseased tonsil, that has attained any considerable size, it certainly ought to be removed.

As to the time for the removal of the tonsils, I have not observed any of the indications Dr. Churchill spoke of. He may be correct, and I must confess that I have not seen patients very often after removing their tonsils. Generally, after removing tonsils from children, I see them in a couple of weeks, and perhaps do not see them again during their lifetime, or, if I do see them again, it is for some other trouble. I stated in my paper that in the 100 cases there was only one child under ten years of age in whom I found tonsillitis. I am not sure whether that was an acute tonsillitis or not, but I believe it was. Considering the fact that I have removed tonsils from hundreds of children, it is surprising that I have only one case of acute tonsillitis in a young child, although I have the records of all the cases that I have treated for over thirty years.

DR. ROBERTSON (closing the discussion).—There have been more than eleven cases of primary tuberculosis of the tonsil reported up to the present time. Dr. Ingals made a mistake; it is not that there were not more, but that there were only eleven cases found post-mortem where there was not tuberculosis found in other parts of the body, as pointed out by Dr. Eisendrath. It depends a good deal upon what we call primary tuberculosis. To say that we have primary tuberculosis would indicate that we are unable to find any trace of tuberculosis in any other part of the body, and that we can demonstrate this disease in the tonsil by the microscopic slide after the gland has been removed. That is as near as we can tell primary tuberculosis without a post-mortem. If we have a slide showing a broken-down lymph body that shows giant cells and epithelioid tissue, it is evidence enough that we have tubercular disease. Of course, there are lots of tonsils which may break down and

show giant cells which are not tubercular as in syphilis or chronic granulations.

Secondary tuberculosis will manifest itself as an ulceration of the tonsil.

As regards the size of the tonsils to be removed. That phase of the subject was not touched upon, nor was the method of removal referred to in this paper.

I would like to say, however, that any tonsil that is perceptibly enlarged is pathologic and should be removed.

There is no more reason why we should keep a diseased tonsil in the throat than a diseased appendix in the abdomen, and if any surgeon should diagnose appendicitis in these days and leave the appendix in the abdominal cavity, he would be mobbed. (Laughter.)

Other infections were not touched upon. There are infections which occur by way of the tonsils, and it is absolutely proven in my mind that the tonsil is the first place to be infected, because we can watch the glands beginning to be infected gradually; then we cut the tonsil out and see the infection disappear in a retrograde fashion, showing that the tonsil is the focus of infection. As Dr. Eisendrath has remarked, in removing the glands of the neck it is necessary to remove the tonsil also.

The relation between the two is established and recognized by surgeons.

ERRATUM.



Fig. 4. Nasal Cautery Electrode. (Full size.)

This illustration should be substituted for the one on page 205 of *THE LARYNGOSCOPE*, March, 1907.

